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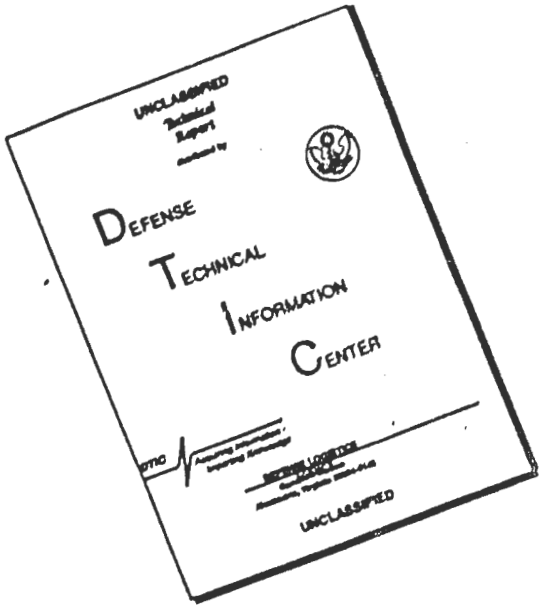

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OCCUPATIONAL SURVEY REPORT
ELECTRONIC PRINCIPLES

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WEATHER EQUIPMENT SPECIALIST

AFSC 30250

AFPT 90-302-222
2 September 1977

OCCUPATIONAL SURVEY BRANCH
USAF OCCUPATIONAL MEASUREMENT CENTER
LACKLAND AFB TEXAS 78236

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20 ABSTRACT (Continue on reverse side if necessary and identify by block number):

This report summarizes the results of the administration of the Electronic Principles Inventory to airmen assigned as Weather Equipment Specialist (AFSC 30250). The report gives a detailed listing of the technical tasks and knowledge needed to perform the jobs within the specialty or career ladder.

CONTINUED (OVER)

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UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

This specialty has the following functions:

Installs, maintains, inspects and repairs electronic and mechanical meteorological observing equipment. Installs and removes meteorological equipment. Performs preventive maintenance on meteorological equipment. Supervises weather equipment maintenance personnel.

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PREFACE

This report presents a summary of the results of a detailed Air Force Electronic Principles Survey of the Weather Equipment Specialist, AFSC 30250.

The Electronic Principles Inventory (EPI) was developed by Major Thomas J. O'Connor and Mr. Hendrick W. Ruck and the survey data were analyzed by 1st Lt Michael J. Kelley. All are members of the Occupational Survey Branch, USAF Occupational Measurement Center, Lackland AFB, Texas.

Computer programs for analyzing the data were designed by Dr. Raymond E. Christal, Occupational and Manpower Research Division, Air Force Human Resources Laboratory (AFHRL), and were written by the Project Analysis and Programming Branch, Computational Sciences Division, AFHRL.

Distribution of this report is made upon request to the USAF Occupational Measurement Center, attention of the Chief, Occupational Survey Branch (OMY), Lackland AFB, Texas 78236.

This report has been reviewed and is approved.

JAMES A. TURNER, JR., Colonel, USAF
Commander
USAF Occupational Measurement Center

WALTER E. DRISKILL, Ph.D.
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ELECTRONIC PRINCIPLES OCCUPATIONAL SURVEY REPORT
WEATHER EQUIPMENT SPECIALIST
AFSC 30250

INTRODUCTION

This report summarizes the results of the administration of the Electronic Principles Inventory to airmen assigned as Weather Equipment Specialist (AFSC 30250). The data for this report were collected during the period April through June 1977.

This report describes: (1) development and administration of the survey instrument; and (2) electronic principles used by DAFSC 5-skill level personnel both CONUS and overseas and assigned to selected major commands.

DEVELOPMENT OF THE ELECTRONIC PRINCIPLES INVENTORY (EPI)

The EPI was developed by personnel from the Occupational Survey Branch who were well qualified in theoretical physics and electronics, as well as in task analysis and survey development. Over 300 maintenance personnel from SAC, TAC, ADC, MAC, and AFCS participated in the development of the inventory. Representing the five ATC training centers, electronics experts who averaged 12 years of maintenance experience and four years of electronic principles instruction experience spent several weeks refining the EPI. In addition, personnel at the Electrical Engineering Department of the USAF Academy and the Air Force Human Resources Laboratory were consulted during the development of the inventory.

The final version of the EPI used in this survey contained 1,257 items in 62 subject matter areas covering all electronic principles training given at the five ATC technical training centers. Table 1 lists the 62 subject areas.

ADMINISTRATION

The Electronic Principles Inventory was administered by mail to AFSC 30250 airmen worldwide. Responses from 111 individuals represented 20 percent of the total of all AFSC 30250 personnel. Table 2 shows the percentage distribution by major command of the survey incumbents.

TABLE 1

EPI SUBJECT AREAS

SEQUENCE OF SUBJECT AREAS	SUBJECT AREA TITLE	BEGINNING ITEM NUMBER	GPSUM PAGE NUMBER
1	MATHEMATICS	A1	2
2	DIRECT CURRENT AND VOLTAGE	A15	2
3	RESISTANCE	A24	2
4	MULTIMETER USES	B52	3
5	ALTERNATING CURRENT	B61	4
6	INDUCTORS AND INDUCTIVE REACTANCE	B67	4
7	CAPACITORS AND CAPACITIVE REACTANCE	C92	5
8	TRANSFORMERS	C128	6
9	MAGNETISM	C171	7
10	RCL CIRCUITS	D185	8
11	SERIES AND PARALLEL RESONANCE (TIME CONSTANTS)	D229	10
12	FILTERS	D239	10
13	COUPLING	E261	11
14	SOLDERING	E273	11
15	RELAYS	E295	12
16	MICROPHONES	F314	12
17	SPEAKERS	F327	13
18	OSCILLOSCOPES	F342	13
19	SEMICONDUCTOR DIODES	G354	13
20	TRANSISTORS	G404	15
21	TRANSISTOR AMPLIFIERS	G428	16
22	SOLID-STATE SPECIAL PURPOSE DEVICES	H477	19
23	POWER SUPPLIES	H483	19
24	OSCILLATORS	H512	19
25	MULTIVIBRATORS	I539	20
26	LIMITERS AND CLAMPERS	I555	21
27	ELECTRON TUBES	I565	21
28	ELECTRON TUBE AMPLIFIERS AND CIRCUITS	J609	22
29	SPECIAL PURPOSE ELECTRON TUBES	J616	23
30	HETERODYNING, MODULATION, AND DEMODULATION	J632	23
31	AM SYSTEMS	K638	23
32	FM SYSTEMS	K666	24

TABLE 1 (CONTINUED)

EPI SUBJECT AREAS

SEQUENCE OF SUBJECT AREAS	SUBJECT AREA TITLE	BEGINNING ITEM NUMBER	GPSUM PAGE NUMBER
33	NUMBERING SYSTEMS	K685	25
34	LOGIC FUNCTIONS	L695	25
35	BOOLEAN EQUATIONS	L708	26
36	COUNTERS	L733	27
37	TIMING CIRCUITS	M757	27
38	USE OF SIGNAL GENERATORS	M769	28
39	MOTORS AND GENERATORS	M779	28
40	METER MOVEMENTS	N808	29
41	SATURABLE REACTORS AND MAGNETIC AMPLIFIERS	N818	29
42	WAVESHAPING CIRCUITS	N834	30
43	SINGLE SIDEBAND SYSTEMS	O845	30
44	PULSE MODULATION SYSTEMS	O875	31
45	ANTENNAS	O914	32
46	TRANSMISSION LINES	P953	34
47	WAVEGUIDES AND CAVITY RESONATORS	P984	35
48	MICROWAVE AMPLIFIERS AND OSCILLATORS	P1034	37
49	REGISTERS	Q1110	39
50	STORAGE DEVICES	Q1117	40
51	DIGITAL TO ANALOG CONVERTERS	Q1126	40
52	PHANTASTRONS	Q1140	41
53	SCHMITT TRIGGERS	R1141	41
54	CABLE FABRICATION	R1144	41
55	INPUT/OUTPUT DEVICES	S1146	41
56	PHOTO SENSITIVE DEVICES	S1149	41
57	SYNCHRONOUS VIBRATIONS (CHOPPER CIRCUITS)	S1150	41
58	INFRARED	T1159	41
59	LASERS	T1186	42
60	DISPLAY TUBES	T1220	43
61	PROGRAMMING	U1234	43
62	DB AND POWER RATIOS	U1255	44

TABLE 2

COMMAND REPRESENTATION OF SURVEY SAMPLE

	30250	
COMMAND	PERCENT ASSIGNED	PERCENT OF SAMPLE
MAC	89	94
AFCS	6	1
ATC	4	4
OTHERS	1	1
TOTAL	100	100

Total Assigned - 544
Total Sampled - 111
Percent Sampled - 20%

PRESENTATON OF RESULTS

Personnel responded "yes" or "no" to the 1,257 electronic principles questions as related to their present job. A Group Summary (GPSUM) computer printout is provided in the Appendix portion of this report. Page 1 of the GPSUM lists the three selected groups identified for this report. Pages 2-44 show the percentage of the incumbents responding to the EPI items. The computer program results display the percent members answering "yes" to the subject area questions. The reader can locate a specific subject area by referring to the Appendix page number as listed in Table 1. For example, the Transformers area results are given on page 6 of the GPSUM. The percentage of survey respondents indicating use of specific electronic principles ranged from high in areas such as Resistance (pp. 2-3), Soldering (pp. 11-12) and Power Supplies (p. 19) to low in areas such as Single Sideband Systems (pp. 30-31) and Digital To Analog Converters (p. 40). Additional AFSC 30250 data can be obtained upon request to the Chief, Occupational Survey Branch (OMY).

APPENDIX

TABULATION OF ELECTRONIC PRINCIPLES UTILIZATION DATA FOR SELECTED GROUPS
IN THE 30250 CAREER FIELD.

REPORTS ON THE FOLLOWING GROUPS WERE REQUESTED

GROUP IDENTITY = SPC001 ALL AIRMEN DAFSC 30250 CONTAINING 111 MEMBERS.
GROUP IDENTITY = SPC002 ALL AIRMEN DAFSC 30250 STATIONED IN CONUS CONTAINING 71 MEMBERS.
GROUP IDENTITY = SPC003 ALL AIRMEN DAFSC 30250 STATIONED OVERSEAS CONTAINING 40 MEMBERS.

BASE GROUP SUMMARY
PERCENT MEMBERS PERFORMING

			BY-TS.	SPC 001	SPC 002	SPC 003	
A	1	A1-01	IN YOUR PRESENT JOB, DO YOU USE INSTRUMENTS, SUCH AS METERS OR OSCILLOSCOPES, IN WHICH IT IS NECESSARY TO AMPLIFY OR ATTENUATE VOLTAGE, RESISTANCE, ETC., BY POWERS OF 10.	93	94	90	
A	2	A1-02	DO YOU USE PUBLICATIONS, SUCH AS A TECHNICAL ORDERS OR MAINTENANCE MANUALS, IN WHICH IT IS NECESSARY FOR YOU TO MULTIPLY OR DIVIDE BY A POWER OF 10 BEFORE YOU CAN APPLY THE INFORMATION FROM THE PUBLICATION IN A USEFUL WAY ON THE JOB.	55	51	83	
A	3	A1-03	DO YOU REARRANGE AND SOLVE FORMULAS OR EQUATIONS.	90	92	90	
A	4	A1-04	DO YOU CALCULATE THE SQUARE ROOT OF A QUANTITY.	20	28	5	MATHEMATICS
A	5	A1-05	DO YOU SOLVE FOR UNKNOWN QUANTITIES.	91	94	38	
A	6	A1-06	DO YOU CONVERT NUMBERS TO LOGARITHMS.	17	23	7	
A	7	A1-07	DO YOU USE LOGARITHM TABLES IN ANY TYPE OF CALCULATIONS.	25	25	10	
A	8	A1-08	DO YOU SOLVE QUADRATIC EQUATIONS.	14	11	17	
A	9	A1-09	DO YOU USE THE NATURAL SYSTEM OF LOGARITHMS.	10	13	5	
A	10	A1-10	DO YOU PERFORM CALCULATIONS ON VECTOR QUANTITIES.	21	25	13	
A	11	A1-11	DO YOU WORK WITH TRIGONOMETRIC FUNCTIONS SUCH AS SINE, COSINE, OR TANGENT.	32	39	20	
A	12	A1-12	DO YOU DETERMINE AREAS OF PLANE FIGURES.	6	11	2	
A	13	A1-13	DO YOU SOLVE OR USE SIMULTANEOUS EQUATIONS.	8	10	5	
A	14	A1-14	DO YOU SOLVE OR USE PROPORTIONS.	35	35	35	
A	15	A2-01	DO YOU USE THE TERM VOLTAGE OR VOLT (V).	98	97	100	
A	16	A2-02	DO YOU USE THE TERM ELECTROMOTIVE FORCE (EMF).	81	70	95	
A	17	A2-03	DO YOU USE THE TERM OHM.	99	99	100	
A	18	A2-04	DO YOU USE THE TERM ION.	24	34	17	
A	19	A2-05	DO YOU USE THE TERM DYNE.	13	18	15	
A	20	A2-06	DO YOU USE THE TERM AMPERE.	97	96	100	DIRECT CURRENT AND VOLTAGE
A	21	A2-07	DO YOU USE THE TERM NEUTRON.	23	32	7	
A	22	A2-08	DO YOU USE THE TERM COULOMB.	20	23	15	
A	23	A2-09	DO YOU USE THE TERM PROTON.	23	31	7	
A	24	A3-01	DO YOU WORK WITH RESISTORS IN YOUR PRESENT JOB.	86	84	85	
A	25	A3-02	DO YOU INSPECT RESISTORS.	95	97	90	
A	26	A3-03	DO YOU CLEAN RESISTORS.	94	94	92	
A	27	A3-04	DO YOU ADJUST RESISTORS.	94	94	90	
A	28	A3-05	DO YOU CHECK OHMIC VALUE OF RESISTORS.	94	99	92	RESISTANCE
A	29	A3-06	DO YOU REMOVE OR REPLACE RESISTORS.	95	97	92	
A	30	A3-07	DO YOU USE OR REFER TO TEMPERATURE COEFFICIENTS FOR RESISTORS ON ANY TASKS YOU PERFORM.	57	59	90	
A	31	A3-08	DO YOU USE OR REFER TO RESISTOR SYMBOLS SUCH AS FIXED RESISTOR SYMBOLS OR TAPPED RESISTOR SYMBOLS.	95	97	92	
A	32	A3-09	DO YOU IDENTIFY OR CLASSIFY THE RESISTORS YOU WORK WITH AS CARBON, FIELD WIRE, SLIDE TAP, RHEOSTAT, OR POTENTIOMETER.	95	97	92	
A	33	A3-10	DO YOU USE RESISTOR COLOR CODES WHICH INDICATE OHMIC VALUE OF RESISTANCE.	95	97	90	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

			BY-TSK	SPC 001	SPC 002	SPC 003	
A	34	AJ-11	DO YOU USE RESISTOR COLOR CODES WHICH INDICATE TOLERANCE.	92	93	90	
A	35	AJ-12	DO YOU USE RESISTOR COLOR CODES WHICH INDICATE FAILURE RATE.	29	35	17	
A	36	AJ-13	DO YOU MAKE DECISIONS IN WHICH YOU MUST DETERMINE HOW TWO OR MORE BATTERIES MUST BE CONNECTED TOGETHER TO ACHIEVE A SPECIFIC VOLTAGE.	46	52	35	
A	37	AJ-14	DO YOU USE OR REFER TO THE SCHEMATIC SYMBOLS WHICH REPRESENT BATTERIES, FUSES, CONDUCTORS, LAMPS, OR SWITCHES	97	99	95	
A	38	AJ-15	DO YOU CALCULATE TOTAL RESISTANCE FOR SERIES RESISTIVE CIRCUITS.	77	85	65	
A	39	AJ-16	DO YOU CALCULATE TOTAL CURRENT FOR SERIES RESISTIVE CIRCUITS.	73	79	65	
A	40	AJ-17	DO YOU CALCULATE INDIVIDUAL VOLTAGE DROPS FOR SERIES RESISTIVE CIRCUITS.	77	85	65	
A	41	AJ-18	DO YOU CALCULATE POWER DISSIPATION FOR SERIES RESISTIVE CIRCUITS.	59	62	52	
A	42	AJ-19	DO YOU CALCULATE TOTAL RESISTANCE FOR SERIES PARALLEL RESISTIVE CIRCUITS.	75	82	63	
A	43	AJ-20	DO YOU CALCULATE TOTAL CURRENT FOR SERIES PARALLEL RESISTIVE CIRCUITS.	72	79	60	
A	44	AJ-21	DO YOU CALCULATE INDIVIDUAL VOLTAGE DROPS FOR SERIES PARALLEL RESISTIVE CIRCUITS.	75	83	60	
A	45	AJ-22	DO YOU CALCULATE INDIVIDUAL BRANCH CURRENTS FOR SERIES PARALLEL RESISTIVE CIRCUITS.	68	75	55	
A	46	AJ-23	DO YOU CALCULATE POWER DISSIPATION FOR SERIES PARALLEL RESISTIVE CIRCUITS.	56	62	45	
A	47	AJ-24	DO YOU CALCULATE TOTAL RESISTANCE FOR PARALLEL RESISTIVE CIRCUITS.	73	79	63	
A	48	AJ-25	DO YOU CALCULATE TOTAL CURRENT FOR PARALLEL RESISTIVE CIRCUITS.	68	75	57	
A	49	AJ-26	DO YOU CALCULATE INDIVIDUAL VOLTAGE DROPS FOR PARALLEL RESISTIVE CIRCUITS.	74	82	60	
A	50	AJ-27	DO YOU CALCULATE INDIVIDUAL BRANCH CURRENTS FOR PARALLEL RESISTIVE CIRCUITS.	68	73	57	
A	51	AJ-28	DO YOU CALCULATE POWER DISSIPATION FOR PARALLEL RESISTIVE CIRCUITS.	54	59	45	
B	52	BI-01	DO YOU MEASURE RESISTANCE.	98	99	97	
B	53	BI-02	DO YOU REPAIR OHMMETERS.	7	7	7	
B	54	BI-03	DO YOU MEASURE VOLTAGE.	98	99	97	
B	55	BI-04	DO YOU REPAIR VOLTMETERS.	7	7	7	
B	56	BI-05	DO YOU REPAIR AMMETERS.	7	8	5	
B	57	BI-06	DO YOU MEASURE CURRENT.	96	97	95	MULTIMETER USES
B	58	BI-07	DO YOU USE MULTIMETERS.	98	99	97	
B	59	BI-08	DO YOU DIRECTLY USE A QUANTITY OF CHARGE CALLED A COULOMB.	6	7	5	
B	60	BI-09	DO YOU READ SCHEMATICS.	99	97	100	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

				SPC 001	SPC 002	SPC 003	
B	61	B2-01	DO YOU USE OR REFER TO THE TERM EFFECTIVE VOLTAGE (RMS).	79	80	77	
B	62	B2-02	DO YOU USE OR REFER TO THE TERM PEAK TO PEAK VOLTAGE.	89	93	82	ALTERNATING CURRENT
B	63	B2-03	DO YOU USE OR REFER TO THE TERM AVERAGE VOLTAGE (DC).	86	93	80	
B	64	B2-04	DO YOU USE OR REFER TO THE TERM WAVE LENGTH.	79	87	65	
B	65	B2-05	DO YOU USE OR REFER TO THE TERM FREQUENCY.	92	97	82	
B	66	B2-06	DO YOU USE OR REFER TO THE TERM INSTANTANEOUS VALUE.	87	91	80	
B	67	B3-01	DO YOU WORK WITH INDUCTORS OR CIRCUITS CONTAINING INDUCTORS, CHOKES, OR CHOKE COILS IN YOUR PRESENT JOB.	83	89	72	
B	68	B3-02	DO YOU INSPECT INDUCTORS.	84	90	72	
B	69	B3-03	DO YOU CLEAN INDUCTORS.	82	87	72	
B	70	B3-04	DO YOU ADJUST INDUCTORS.	79	87	65	
B	71	B3-05	DO YOU REMOVE OR REPLACE INDUCTORS.	88	93	80	
B	72	B3-06	DO YOU USE OR REFER TO INDUCTANCE.	77	82	70	
B	73	B3-07	DO YOU USE OR REFER TO HENRIES.	63	68	55	
B	74	B3-08	DO YOU USE OR REFER TO INDUCTIVE REACTANCE.	66	73	57	
B	75	B3-09	DO YOU USE OR REFER TO COPPER LOSS IN INDUCTORS.	21	28	7	
B	76	B3-10	DO YOU USE OR REFER TO HYSTERESIS LOSS IN INDUCTORS.	33	42	17	
B	77	B3-11	DO YOU USE OR REFER TO EDDY CURRENT LOSS IN INDUCTORS	26	37	7	
B	78	B3-12	DO YOU USE OR REFER TO THE GENERAL RULE THAT INDUCTANCE IS PROPORTIONAL TO THE SQUARE OF THE NUMBER OF TURNS OF THE COIL.	22	25	15	INDUCTORS AND INDUCTIVE REACTANCE
B	79	B3-13	DO YOU USE OR REFER TO THE GENERAL RULE THAT THE INDUCTANCE OF A COIL IS DIRECTLY PROPORTIONAL TO THE CROSS SECTIONAL AREA OF THE CORE.	17	20	13	
B	80	B3-14	DO YOU USE OR REFER TO THE GENERAL RULE THAT THE INDUCTANCE OF A COIL IS INVERSELY PROPORTIONAL TO ITS LENGTH.	21	25	13	
B	81	B3-15	DO YOU USE OR REFER TO THE GENERAL RULE THAT THE INDUCTANCE OF A COIL IS DIRECTLY PROPORTIONAL TO THE PERMEABILITY OF THE CORE MATERIAL.	23	31	7	
B	82	B3-16	DO YOU CALCULATE INDUCTANCE FOR PARTICULAR INDUCTORS USING FORMULAS.	23	31	10	
B	83	B3-17	DO YOU CALCULATE THE TOTAL INDUCTANCE FOR INDUCTANCE IN SERIES.	28	34	17	
B	84	B3-18	DO YOU CALCULATE THE TOTAL INDUCTANCE FOR INDUCTORS IN PARALLEL.	28	34	17	
B	85	B3-19	DO YOU CALCULATE THE TOTAL INDUCTANCE FOR INDUCTORS IN SERIES-PARALLEL CIRCUITS.	27	34	15	
B	86	B3-20	DO YOU USE OR REFER TO THE GENERAL RULE THAT CURRENT LAGS VOLTAGE IN AC INDUCTOR CIRCUITS.	44	52	30	
B	87	B3-21	DO YOU CALCULATE INDUCTIVE REACTANCE.	31	38	17	
B	88	B3-22	DO YOU USE OR REFER TO THE GENERAL RULE THAT INDUCTIVE REACTANCE IS DIRECTLY PROPORTIONAL TO FREQUENCY.	41	46	30	
B	89	B3-23	DO YOU WORK WITH POWER INDUCTORS.	55	62	42	
B	90	B3-24	DO YOU WORK WITH AUDIO FREQUENCY INDUCTORS.	55	55	55	
B	91	B3-25	DO YOU WORK WITH RADIO FREQUENCY INDUCTORS.	63	70	50	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		DY-TSK	SPC 001	SPC 002	SPC 003	
C 92	C1-01	DO YOU WORK WITH CAPACITORS OR CIRCUITS CONTAINING CAPACITORS IN YOUR PRESENT JOB.	93	9A	A8	
C 93	C1-02	DO YOU INSPECT CAPACITORS.	95	97	90	
C 94	C1-03	DO YOU CLEAN CAPACITORS.	91	93	88	
C 95	C1-04	DO YOU ADJUST CAPACITORS.	82	86	75	
C 96	C1-05	DO YOU TEST CAPACITORS.	87	89	85	
C 97	C1-06	DO YOU DISCHARGE CAPACITORS.	94	96	90	
C 98	C1-07	DO YOU REMOVE OR REPLACE CAPACITORS.	96	97	95	
C 99	C1-08	DO YOU USE OR REFER TO DISTRIBUTED CAPACITANCE.	32	42	13	
C 100	C1-09	DO YOU USE OR REFER TO ORBITAL STRESS OF ELECTRONS IN A DIELECTRIC.	6	8	2	
C 101	C1-10	DO YOU USE OR REFER TO FARADS, MICROFARADS, OR PICOFARADS.	88	92	82	
C 102	C1-11	DO YOU USE OR REFER TO CAPACITANCE.	90	93	85	
C 103	C1-12	DO YOU USE OR REFER TO DIELECTRIC CONSTANT	23	28	15	
C 104	C1-13	DO YOU USE OR REFER TO WORKING VOLTAGE RATING OF CAPACITORS	79	83	72	
C 105	C1-14	DO YOU USE OR REFER TO CAPACITIVE REACTANCE	53	58	45	
C 106	C1-15	DO YOU USE OR REFER TO CAPACITOR COLOR CODES	5A	61	47	CAPACITORS AND CAPACITIVE REACTANCE
C 107	C1-16	DO YOU WORK WITH CAPACITORS IN DC CIRCUITS	95	97	90	
C 108	C1-17	DO YOU WORK WITH CAPACITORS IN AC CIRCUITS	96	99	92	
C 109	C1-18	DO YOU WORK WITH CAPACITORS IN CIRCUITS WITH BOTH DC AND AC	95	99	88	
C 110	C1-19	DO YOU WORK WITH CAPACITORS IN DON'T REMEMBER WHICH CIRCUITS	17	20	13	
C 111	C1-20	DO YOU CALCULATE CAPACITANCE FOR PARTICULAR CAPACITORS USING FORMULAS	26	32	15	
C 112	C1-21	DO YOU USE OR REFER TO THE GENERAL RULE THAT CAPACITANCE OF A CAPACITOR IS DIRECTLY PROPORTIONAL TO THE DIELECTRIC CONSTANT	19	21	15	
C 113	C1-22	DO YOU USE OR REFER TO THE GENERAL RULE THAT CAPACITANCE OF A CAPACITOR IS INVERSELY PROPORTIONAL TO THE DIELECTRIC THICKNESS	20	24	13	
C 114	C1-23	DO YOU CALCULATE THE TOTAL CAPACITANCE OF CAPACITORS IN SERIES	40	48	25	
C 115	C1-24	DO YOU CALCULATE THE TOTAL CAPACITANCE OF CAPACITORS IN PARALLEL	40	48	25	
C 116	C1-25	DO YOU CALCULATE THE TOTAL CAPACITANCE OF CAPACITORS IN SERIES-PARALLEL CIRCUITS	36	45	20	
C 117	C1-26	DO YOU USE OR REFER TO THE GENERAL RULE THAT CURRENT DOES NOT FLOW THROUGH CAPACITORS, IT ONLY APPEARS TO DO SO	61	73	40	
C 118	C1-27	DO YOU USE OR REFER TO THE GENERAL RULE THAT CURRENT LEADS VOLTAGE IN AC CAPACITOR CIRCUITS	47	55	32	
C 119	C1-28	DO YOU USE OR REFER TO THE GENERAL RULE THAT CAPACITIVE REACTANCE IS INVERSELY PROPORTIONAL TO FREQUENCY	37	42	27	
C 120	C1-29	DO YOU CALCULATE CAPACITIVE REACTANCE	29	35	17	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		QY-TSK	SPC 001	SPC 002	SPC 003	
C 121	C1-30	DO YOU WORK WITH ROTOR-STATOR (VARIABLE) CAPACITORS	67	77	47	
C 122	C1-31	DO YOU WORK WITH COMPRESSION (TRIMMER) CAPACITORS	60	68	47	
C 123	C1-32	DO YOU WORK WITH ELECTROLYTIC (FIXED) CAPACITORS	95	96	95	
C 124	C1-33	DO YOU WORK WITH PAPER (FIXED) CAPACITORS	86	87	85	
C 125	C1-34	DO YOU WORK WITH MICA (FIXED) CAPACITORS	91	92	90	
C 126	C1-35	DO YOU WORK WITH CERAMIC (FIXED) CAPACITORS	92	94	88	
C 127	C1-36	DO YOU WORK WITH DON'T REMEMBER WHICH TYPE OF CAPACITORS	13	13	13	
C 128	C2-01	DO YOU WORK WITH TRANSFORMERS IN YOUR PRESENT JOB	90	92	88	
C 129	C2-02	DO YOU INSPECT TRANSFORMERS	93	93	92	
C 130	C2-03	DO YOU CLEAN TRANSFORMERS	94	94	92	
C 131	C2-04	DO YOU ADJUST TRANSFORMERS	86	89	82	
C 132	C2-05	DO YOU TROUBLESHOOT TRANSFORMERS	86	90	80	
C 133	C2-06	DO YOU REMOVE OR REPLACE COMPLETE TRANSFORMERS	95	94	95	
C 134	C2-07	DO YOU REMOVE OR REPLACE TRANSFORMER PARTS, SUCH AS THE PRIMARY WINDING	6	7	5	
C 135	C2-08	DO YOU MAKE A DISTINCTION BETWEEN MUTUAL INDUCTION AND MUTUAL INDUCTANCE (M)	4	4	0	
C 136	C2-09	DO YOU USE THE SYMBOL FOR MUTUAL INDUCTANCE, M	5	7	2	
C 137	C2-10	DO YOU REFER TO OR USE THE COEFFICIENT OF COUPLING WHEN WORKING WITH TRANSFORMERS	18	24	7	TRANSFORMERS
C 138	C2-11	DO YOU CALCULATE TURNS RATIOS FOR TRANSFORMERS USING CURRENT OR VOLTAGE RATIOS	32	38	20	
C 139	C2-12	DO YOU REFER TO REFLECTED IMPEDANCE WHEN WORKING WITH TRANSFORMERS	21	28	7	
C 140	C2-13	DO YOU CALCULATE IMPEDANCE INTERACTIONS FOR TRANSFORMERS	13	17	5	
C 141	C2-14	DO YOU WORK WITH AUTOTRANSFORMERS	79	83	72	
C 142	C2-15	DO YOU WORK WITH POWER TRANSFORMERS	89	92	85	
C 143	C2-16	DO YOU WORK WITH AUDIO TRANSFORMERS	66	69	60	
C 144	C2-17	DO YOU WORK WITH RADIO FREQUENCY TRANSFORMERS	70	76	60	
C 145	C2-18	DO YOU WORK WITH DON'T REMEMBER WHAT TYPE OF TRANSFORMERS	14	14	13	
C 146	C2-19	DO YOU CHECK TRANSFORMERS FOR OPEN WINDINGS BY MEASURING RESISTANCE	94	93	95	
C 147	C2-20	DO YOU CHECK TRANSFORMERS FOR SHORTED WINDINGS BY MEASURING RESISTANCE	88	87	90	
C 148	C2-21	DO YOU CHECK TRANSFORMERS FOR SHORTED WINDINGS BY MEASURING OUTPUT VOLTAGES	84	86	80	
C 149	C2-22	DO YOU MEASURE RESISTANCE OF TRANSFORMER WINDINGS TO DETERMINE WHETHER A TRANSFORMER HAS A STEP-UP OR STEP-DOWN TURNS RATIO	41	44	35	
C 150	C2-23	DO YOU MEASURE OUTPUT VOLTAGE OF TRANSFORMERS TO DETERMINE WHETHER A TRANSFORMER HAS A STEP-UP OR STEP-DOWN TURNS RATIO	60	68	47	
C 151	C2-24	DO YOU REFER TO BASIC TRANSFORMER SCHEMATIC SYMBOLS FOR TRANSFORMERS	95	94	95	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		DUTYS.	SPC 001	SPC 002	SPC 003	
C 152	C2-25	DO YOU REFER TO MULTIPLE SECONDARY-WINDINGS SCHEMATIC SYMBOLS FOR TRANSFORMERS	86	85	88	
C 153	C2-26	DO YOU REFER TO MULTIPLE TAP SCHEMATIC SYMBOLS FOR TRANSFORMERS	89	89	90	
C 154	C2-27	DO YOU REFER TO CENTER TAP SCHEMATIC SYMBOLS FOR TRANSFORMERS	95	94	95	
C 155	C2-28	DO YOU REFER TO AIR CORE SCHEMATIC SYMBOLS FOR TRANSFORMERS	71	75	65	
C 156	C2-29	DO YOU REFER TO IRON CORE SCHEMATIC SYMBOLS FOR TRANSFORMERS	74	77	67	
C 157	C2-30	DO YOU REFER TO COMBINATIONS OF THE ABOVE SCHEMATIC SYMBOLS FOR TRANSFORMERS	79	80	77	
C 158	C2-31	DO YOU DETERMINE PHASE RELATIONSHIPS BETWEEN SECONDARY AND PRIMARY VOLTAGES OF TRANSFORMERS USING SCHEMATIC SYMBOLS	56	59	50	
C 159	C2-32	DO YOU DETERMINE OR REFER TO THE TYPE OF CORE IN TRANSFORMERS YOU WORK WITH	41	49	25	
C 160	C2-33	DO YOU REFER TO OR USE THE GENERAL RULE THAT THE TURNS RATIO OF A TRANSFORMER IS EQUAL TO THE VOLTAGE RATIO	39	45	27	
C 161	C2-34	DO YOU USE OR REFER TO STEP-UP OR STEP-DOWN RATIOS FOR TRANSFORMERS	63	70	50	
C 162	C2-35	DO YOU CALCULATE VOLTAGE RATIOS FOR TRANSFORMERS USING TURNS RATIOS	27	30	22	
C 163	C2-36	DO YOU CALCULATE CURRENT RATIOS FOR TRANSFORMERS USING TURNS RATIOS	22	25	15	
C 164	C2-37	DOES YOUR JOB INVOLVE ANY TASKS DEALING WITH THREE PHASE TRANSFORMERS	21	24	15	
C 165	C2-38	DO YOU INSPECT THREE PHASE TRANSFORMERS	16	20	10	
C 166	C2-39	DO YOU CLEAN OR LUBRICATE THREE PHASE TRANSFORMERS	12	17	2	
C 167	C2-40	DO YOU ADJUST THREE PHASE TRANSFORMERS	12	17	2	
C 168	C2-41	DO YOU TROUBLESHOOT THREE PHASE TRANSFORMERS	15	18	10	
C 169	C2-42	DO YOU REMOVE OR REPLACE COMPLETE THREE PHASE TRANSFORMERS	14	18	13	
C 170	C2-43	DO YOU RE-WIND OR REPLACE THREE PHASE TRANSFORMER PARTS SUCH AS WINDINGS	4	4	2	
C 171	C3-01	DO YOU USE OR REFER TO PERMANENT MAGNETS	82	85	77	
C 172	C3-02	DO YOU USE OR REFER TO TEMPORARY MAGNETS	44	49	35	
C 173	C3-03	DO YOU USE OR REFER TO RETENTIVITY OF MAGNETIC MATERIALS	20	27	7	
C 174	C3-04	DO YOU USE OR REFER TO RELUCTANCE OF MAGNETIC MATERIALS	19	25	7	
C 175	C3-05	DO YOU USE OR REFER TO PERMEABILITY OF MAGNETIC MATERIALS	23	32	7	MAGNETISM
C 176	C3-06	DO YOU USE OR REFER TO RESIDUAL MAGNETISM	23	28	13	
C 177	C3-07	DO YOU USE OR REFER TO MAGNETIC LINES OF FORCE OR FLUX	54	65	35	
C 178	C3-08	DO YOU USE OR REFER TO WEBER'S THEORY OF MAGNETISM	11	15	2	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		TASKS	SPC 001	SPC 002	SPC 003	
C 178	C3-09	DO YOU USE OR REFER TO DOMAIN THEORY OF MAGNETISM	11	15	2	
C 180	C3-10	DO YOU USE OR REFER TO MAGNETIC INDUCTION	39	42	32	
C 181	C3-11	DO YOU USE OR REFER TO FLUX DENSITY	30	39	13	
C 182	C3-12	DO YOU USE OR REFER TO THE GENERAL RULE THAT FOR MAGNETIC POLES, LIKE POLES REPEL AND UNLIKE POLES ATTRACT	64	69	55	
C 184	C3-13	DO YOU USE THE LEFT HAND THUMB RULE TO FIND THE DIRECTION OF MAGNETIC FIELDS ABOUT STRAIGHT WIRES	32	44	13	
C 186	C3-14	DO YOU USE THE LEFT HAND THUMB RULE TO FIND THE NORTH POLE OF A CURRENT CARRYING COIL	32	42	13	
D 195	D1-01	DO YOU WORK WITH RCL OR LRC RCL CIRCUITS IN YOUR PRESENT JOB	73	79	63	
D 196	D1-02	DO YOU USE OR REFER TO VECTORS WHEN WORKING WITH RCL CIRCUITS	19	27	5	
D 197	D1-03	DO YOU USE OR REFER TO PYTHAGOREAN THEOREM WHEN WORKING WITH RCL CIRCUITS	15	21	5	
D 198	D1-04	DO YOU USE OR REFER TO SINE WHEN WORKING WITH RCL CIRCUITS	22	31	5	
D 199	D1-05	DO YOU USE OR REFER TO COSINE WHEN WORKING WITH RCL CIRCUITS	23	31	7	
D 190	D1-06	DO YOU USE OR REFER TO TANGENT WHEN WORKING WITH RCL CIRCUITS	19	27	5	
D 191	D1-07	DO YOU USE OR REFER TO WATTS WHEN WORKING WITH RCL CIRCUITS	55	63	40	
D 192	D1-08	DO YOU USE OR REFER TO TRUE POWER (PT) WHEN WORKING WITH RCL CIRCUITS	41	49	25	RCL CIRCUITS
D 193	D1-09	DO YOU USE OR REFER TO MAXIMUM POWER (PM) WHEN WORKING WITH RCL CIRCUITS	41	48	30	
D 194	D1-10	DO YOU USE OR REFER TO AVERAGE POWER (PAVE) WHEN WORKING WITH RCL CIRCUITS	51	61	35	
D 195	D1-11	DO YOU USE OR REFER TO APPARENT POWER (PA) WHEN WORKING WITH RCL CIRCUITS	34	42	20	
D 196	D1-12	DO YOU USE OR REFER TO POWER FACTOR (PF) WHEN WORKING WITH RCL CIRCUITS	37	44	25	
D 197	D1-13	DO YOU USE OR REFER TO RESONANT CIRCUITS WHEN WORKING WITH RCL CIRCUITS	59	66	47	
D 198	D1-14	DO YOU USE OR REFER TO BANDWIDTH WHEN WORKING WITH RCL CIRCUITS	69	79	52	
D 199	D1-15	DO YOU USE OR REFER TO SELECTIVITY WHEN WORKING WITH RCL CIRCUITS	53	63	35	
D 200	D1-16	DO YOU USE OR REFER TO RESONANT FREQUENCY WHEN WORKING WITH RCL CIRCUITS	66	76	47	
D 201	D1-17	DO YOU USE OR REFER TO HALF POWER POINTS WHEN WORKING WITH RCL CIRCUITS	59	68	45	
D 202	D1-18	DO YOU USE OR REFER TO BANDPASS REGION WHEN WORKING WITH RCL CIRCUITS	57	61	50	
D 203	D1-19	DO YOU USE OR REFER TO CIRCUIT Q WHEN WORKING WITH RCL CIRCUITS	41	44	38	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	QY-TS#	SPC 001	SPC 002	SPC 003
D 204	01-20 DO YOU USE OR REFER TO TANK CIRCUITS WHEN WORKING WITH RCL CIRCUITS	69	77	55
D 205	01-21 DO YOU DETERMINE VALUES OF TRIGONOMETRIC FUNCTIONS USING FORMULAS	16	21	7
D 206	01-22 DO YOU DRAW VOLTAGE, CURRENT, OR IMPEDANCE VECTOR DIAGRAMS FOR CIRCUITS	12	17	2
D 207	01-23 DO YOU CALCULATE TOTAL IMPEDANCE FOR CAPACITIVE CIRCUITS	22	30	7
D 208	01-24 DO YOU CALCULATE PHASE ANGLES BETWEEN IMPEDANCE AND RESISTANCE IN CAPACITIVE CIRCUITS	18	25	5
D 209	01-25 DO YOU CALCULATE TOTAL IMPEDANCE FOR SERIES RCL CIRCUITS	22	31	5
D 210	01-26 DO YOU CALCULATE IMPEDANCE ANGLES FOR SERIES RCL CIRCUITS	14	21	0
D 211	01-27 DO YOU CALCULATE APPARENT POWER (PA) FOR SERIES RCL CIRCUITS	17	27	0
D 212	01-28 DO YOU CALCULATE TRUE POWER (PT) FOR SERIES RCL CIRCUITS	17	27	0
D 213	01-29 DO YOU CALCULATE POWER FACTORS (PF) FOR SERIES RCL CIRCUITS	20	31	0
D 214	01-30 DO YOU CALCULATE TOTAL CURRENT FOR PARALLEL RCL CIRCUITS	25	35	7
D 215	01-31 DO YOU CALCULATE IMPEDANCE ANGLES FOR PARALLEL RCL CIRCUITS	14	23	0
D 216	01-32 DO YOU CALCULATE TOTAL IMPEDANCE FOR PARALLEL RCL CIRCUITS USING THE ASSUMED VOLTAGE METHOD	18	27	2
D 217	01-33 DO YOU CALCULATE TOTAL IMPEDANCE FOR PARALLEL RCL CIRCUITS USING OHM'S LAW	22	32	2
D 218	01-34 DO YOU CHECK CAPACITORS USING OHMMETERS	74	79	65
D 219	01-35 DO YOU CHECK CAPACITORS USING SUBSTITUTION	52	56	45
D 220	01-36 DO YOU CHECK INDUCTORS USING OHMMETERS	73	76	67
D 221	01-37 DO YOU CHECK INDUCTORS USING SUBSTITUTION	44	48	38
D 222	01-38 DO YOU USE OR REFER TO THE GENERAL RULE THAT THETA= 0, PF = 1, AND PA = PT FOR RESONANT CIRCUITS	14	18	5
D 223	01-39 DO YOU CALCULATE RESONANT FREQUENCIES FOR RCL CIRCUITS	25	34	10
D 224	01-40 DO YOU USE OR REFER TO THE GENLNAL RULE THAT IMPEDANCE IS MINIMUM AND CURRENT MAXIMUM AT THE RESONANT FREQUENCY FOR SERIES RCL CIRCUITS	30	37	17
D 225	01-41 DO YOU USE OR REFER TO THE GENERAL RULE THAT LINE CURRENT IS MINIMUM AND IMPEDANCE MAXIMUM AT RESONANT FREQUENCY FOR PARALLEL RCL CIRCUITS	30	35	20
D 226	01-42 DO YOU USE OR REFER TO THE GENERAL RULE THAT HALF POWER POINTS ARE AT 70.7 PERCENT OF THE PEAK CURRENT VALUE	51	58	40
D 227	01-43 DO YOU USE OR REFER TO THE GENERAL RULE THAT BANDWIDTH IS INVERSELY PROPORTIONAL TO Q	30	35	20
D 228	01-44 DO YOU DETERMINE HOW CHANGES IN FREQUENCY, RESISTANCE, CAPACITANCE, OR INDUCTANCE WILL AFFECT CURRENT OR PHASE ANGLES FOR RCL CIRCUITS	28	35	15

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	QUESTION	SPC 001	SPC 002	SPC 003	
D 229	D2-01 IN YOUR PRESENT JOB, DO YOU WORK WITH, USE, OR REFER TO SERIES OR PARALLEL RESONANT CIRCUITS OR TIME CONSTANTS	57	63	45	
D 230	D2-02 DO YOU WORK WITH, USE, OR REFER TO TIME CONSTANTS	53	59	42	
D 231	D2-03 DO YOU WORK WITH, USE, OR REFER TO AVAILABLE VOLTAGE	33	39	22	
D 232	D2-04 DO YOU WORK WITH, USE, OR REFER TO TRANSIENT INTERVALS	30	32	25	
D 233	D2-05 DO YOU USE OR REFER TO THE GENERAL RULE THAT A CAPACITOR IS FULLY CHARGED (OR DISCHARGED) AFTER FIVE (5) TIME CONSTANTS (TC)	43	51	30	SERIES AND PARALLEL RESONANCE (TIME CONSTANTS)
D 234	D2-06 DO YOU USE OR REFER TO UNIVERSAL TIME CONSTANT CHARTS	17	23	7	
D 235	D2-07 DO YOU USE EQUATIONS OR FORMULAS TO DETERMINE CIRCUIT CURRENT OR COMPONENT VOLTAGES AFTER A SPECIFIC TIME FOR RC OR LR CIRCUITS	16	21	7	
D 236	D2-08 DO YOU USE EQUATIONS OR FORMULAS TO DETERMINE THE TIME REQUIRED FOR CIRCUIT CURRENT OR COMPONENT VOLTAGES TO REACH SPECIFIC VALUES FOR RC OR LR CIRCUITS	16	23	5	
D 237	D2-09 DO YOU USE EQUATIONS OR FORMULAS TO DETERMINE COMPONENT VALUES REQUIRED FOR CIRCUIT CURRENT AND COMPONENT VOLTAGES TO REACH SPECIFIC VALUES IN SPECIFIC TIMES	17	24	5	
D 238	D2-10 DO YOU USE OR REFER TO THE GENERAL RULE THAT CURRENT IN LR CIRCUITS REACHES ITS MINIMUM VALUE (OR ZERO) AFTER FIVE (5) TIME CONSTANTS	21	28	7	
D 239	D3-01 DO YOU WORK WITH CIRCUITS USED AS FILTERS IN YOUR PRESENT JOB	75	83	60	
D 240	D3-02 DO YOU INSPECT FILTER CIRCUITS	76	83	63	
D 241	D3-03 DO YOU CLEAN FILTER CIRCUITS	68	73	60	
D 242	D3-04 DO YOU ALIGN OR ADJUST FILTER CIRCUITS	57	65	42	
D 243	D3-05 DO YOU TROUBLESHOOT TO THE FILTER CIRCUIT LEVEL	73	80	60	
D 244	D3-06 DO YOU TROUBLESHOOT TO COMPONENT PARTS	75	82	63	
D 245	D3-07 DO YOU REMOVE OR REPLACE THE COMPLETE FILTER CIRCUIT	68	75	55	FILTERS
D 246	D3-08 DO YOU REMOVE OR REPLACE FILTER CIRCUIT COMPONENT PARTS	74	80	63	
D 247	D3-09 DO YOU WORK WITH LOW PASS FILTERS	75	85	57	
D 248	D3-10 DO YOU WORK WITH HIGH PASS FILTERS	74	85	58	
D 249	D3-11 DO YOU WORK WITH BANDPASS FILTERS	70	80	52	
D 250	D3-12 DO YOU WORK WITH BAND-REJECT FILTERS	50	61	32	
D 251	D3-13 DON'T REMEMBER WHICH TYPE OF FILTER YOU WORK WITH	11	11	10	
D 252	D3-14 DO YOU WORK WITH L-SECTION FILTER CONFIGURATION	65	75	47	
D 253	D3-15 DO YOU WORK WITH T-SECTION FILTER CONFIGURATION	67	75	52	
D 254	D3-16 DO YOU WORK WITH PI-SECTION FILTER CONFIGURATION	59	66	47	
D 255	D3-17 DON'T REMEMBER WHICH TYPE FILTER CONFIGURATION	14	14	13	
D 256	D3-18 DO THE FILTERS YOU WORK WITH USE PARALLEL RESONANT CIRCUITS	57	63	45	
D 257	D3-19 DO THE FILTERS YOU WORK WITH USE SERIES-PARALLEL CIRCUITS	60	69	45	
D 258	D3-20 DO THE FILTERS YOU WORK WITH USE SERIES RESONANT CIRCUITS	58	65	45	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		DY-TSK	SPC 001	SPC 002	SPC 003	
U	259	D3-21 DON'T REMEMBER WHICH TYPE OF BASIC CIRCUIT	20	21	17	
U	260	D3-22 DO YOU USE EQUATIONS OR FORMULAS TO DETERMINE CAPACITANCE OR INDUCTANCE VALUES REQUIRED FOR SPECIFIC FILTERS	17	25	2	
E	261	E1-01 DO YOU WORK WITH COUPLING DEVICES IN YOUR PRESENT JOB	77	85	63	
E	262	E1-02 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH RC COUPLING	76	83	63	
E	263	E1-03 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH IMPEDANCE COUPLING	68	73	57	
E	264	E1-04 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH TRANSFORMER COUPLING	77	85	65	
E	265	E1-05 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM RC COUPLING	76	83	63	COUPLING
E	266	E1-06 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM IMPEDANCE COUPLING	68	73	57	
E	267	E1-07 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM TRANSFORMER COUPLING	77	85	65	
E	268	E1-08 DO YOU WORK WITH DIRECTLY COUPLED CIRCUITS	75	82	63	
E	269	E1-09 DO YOU WORK WITH CAPACITIVE-RESISTIVE COUPLED CIRCUITS	69	77	55	
E	270	E1-10 DO YOU WORK WITH CAPACITIVE-INDUCTIVE COUPLED CIRCUITS	62	70	47	
E	271	E1-11 DO YOU WORK WITH TRANSFORMER COUPLED CIRCUITS	74	82	65	
E	272	E1-12 DON'T REMEMBER WHICH TYPE OF COUPLING CIRCUITS	12	11	13	
E	273	E2-01 IN YOUR PRESENT JOB, DO YOU PERFORM SOLDERING TECHNIQUES OR INSPECT OR EVALUATE SOLDERED CONNECTIONS	94	94	92	
E	274	E2-02 DO YOU SELECT TYPE OF SOLDER TO USE	75	79	67	
E	275	E2-03 DO YOU ADD FLUX TO CONNECTIONS	90	94	82	
E	276	E2-04 DO YOU CLEAN CONNECTIONS USING SOLVENTS	91	93	88	
E	277	E2-05 DO YOU STRIP INSULATION FROM WIRES	96	97	95	
E	278	E2-06 DO YOU CONNECT OR DISCONNECT HEAT SINKS	96	97	95	
E	279	E2-07 DO YOU BEND OR SHAPE WIRES OR LEADS	96	97	95	SOLDERING
E	280	E2-08 DO YOU CUT WIRES	96	97	95	
E	281	E2-09 DO YOU FILE OR SHAPE SOLDERING IRON TIPS	93	94	90	
E	282	E2-10 DO YOU TIN SOLDERING IRON TIPS	96	97	95	
E	283	E2-11 DO YOU CLEAN SOLDERING IRON TIPS	96	97	95	
E	284	E2-12 DO YOU CLEAN ELECTRICAL SURFACES USING ERASERS	91	93	88	
E	285	E2-13 DO YOU TIN OR PRE-TIN CONDUCTORS	94	94	92	
E	286	E2-14 DO YOU INSPECT SOLDERED CONNECTIONS	95	97	92	
E	287	E2-15 DO YOU DESOLDER CONNECTIONS BY WICKING	75	80	65	
E	288	E2-16 DO YOU DESOLDER CONNECTIONS USING VACUUM DESOLDERING TOOLS	77	86	63	
E	289	E2-17 DO YOU CUT COMPONENT LEADS TO REMOVE COMPONENTS	77	79	75	
E	290	E2-18 DO YOU CRUSH COMPONENTS FOR REMOVAL	24	30	15	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

			OY-TSK	SPC 001	SPC 002	SPC 003	
L	291	L2-19	DO YOU MAKE HANDWIRE CONNECTIONS	89	93	82	
L	292	L2-20	DO YOU MAKE PRINTED CIRCUIT BOARD CONNECTIONS	86	90	80	
L	293	L2-21	DO YOU SOLDER PASSIVE COMPONENTS SUCH AS RESISTORS OR CAPACITORS ON PRINTED CIRCUIT BOARDS	84	89	75	
L	294	L2-22	DO YOU SOLDER ACTIVE COMPONENTS SUCH AS SOLID-STATE DIODES OR TRANSISTORS ON PRINTED CIRCUIT BOARDS	84	87	77	
L	295	E3-01	DO YOU WORK WITH RELAYS ON YOUR PRESENT JOB	93	96	88	
L	296	E3-02	DO YOU ADJUST RELAYS	54	56	50	
L	297	E3-03	DO YOU CLEAN RELAYS	79	85	70	
L	298	E3-04	DO YOU INSPECT RELAYS	89	94	80	
L	299	E3-05	DO YOU REMOVE OR REPLACE COMPLETE RELAYS	94	96	90	
L	300	E3-06	DO YOU REMOVE OR REPLACE PARTS OR RELAYS	31	31	30	
L	301	E3-07	DO YOU TROUBLESHOOT RELAYS	87	90	82	
L	302	E3-08	DO YOU STRAIGHTEN RELAY CONTACTS	70	72	67	
L	303	E3-09	DO YOU PERFORM TASKS ON RELAY CONTACTS	74	73	75	RELAYS
L	304	E3-10	DO YOU PERFORM TASKS ON RELAY CORES	20	21	17	
L	305	E3-11	DO YOU PERFORM TASKS ON RELAY COILS	34	34	35	
L	306	E3-12	DO YOU PERFORM TASKS ON RELAY ARMATURES	37	37	38	
L	307	E3-13	DO YOU PERFORM TASKS ON RELAY SPRINGS	46	45	47	
L	308	E3-14	DO YOU USE OR REFER TO SINGLE POLE, SINGLE THROW (SPST), NORMALLY OPEN (NO) SCHEMATIC SYMBOLS FOR RELAYS	79	85	70	
L	309	E3-15	DO YOU USE OR REFER TO SINGLE POLE, SINGLE THROW (SPST), NORMALLY CLOSED (NC) SCHEMATIC SYMBOLS FOR RELAYS	79	85	70	
L	310	E3-16	DO YOU USE OR REFER TO SINGLE POLE, DOUBLE THROW (SPDT) SCHEMATIC SYMBOLS FOR RELAYS	73	77	65	
L	311	E3-17	DO YOU USE OR REFER TO DOUBLE POLE, DOUBLE THROW (DPDT) SCHEMATIC SYMBOLS FOR RELAYS	75	79	67	
L	312	E3-18	DO YOU USE OR REFER TO OTHER RELAY SYMBOLS SCHEMATIC SYMBOLS FOR RELAYS	73	75	70	
L	313	E3-19	DO YOU CHECK ELECTRICAL CONTINUITY OF COILS BY MEASURING RESISTANCE	87	90	82	
F	314	F1-01	IN YOUR PRESENT JOB, DO YOU PERFORM ANY TASKS DEALING WITH MICROPHONES	11	7	17	
F	315	F1-02	DO YOU INSPECT MICROPHONES	9	6	15	
F	316	F1-03	DO YOU CLEAN MICROPHONES	3	4	13	
F	317	F1-04	DO YOU OPERATE MICROPHONES	10	6	17	
F	318	F1-05	DO YOU TROUBLESHOOT AS FAR AS CHECKING WIRE CONNECTIONS BUT DO NOT TROUBLESHOOT DOWN TO COMPONENT PARTS OR MICROPHONES	8	6	13	MICROPHONES
F	319	F1-06	DO YOU TROUBLESHOOT DOWN TO MICROPHONE PARTS	4	1	7	
F	320	F1-07	DO YOU REMOVE OR REPLACE COMPLETE MICROPHONES	7	4	13	
F	321	F1-08	DO YOU REMOVE OR REPLACE MICROPHONE PARTS	2	0	5	
F	322	F1-09	DO YOU PERFORM TASKS ON CARBON MICROPHONES	5	1	10	
F	323	F1-10	DO YOU PERFORM TASKS ON CAPACITOR MICROPHONES	1	1	0	
F	324	F1-11	DO YOU PERFORM TASKS ON CRYSTAL MICROPHONES	5	3	7	
F	325	F1-12	DO YOU PERFORM TASKS ON DYNAMIC MICROPHONES	1	0	2	
F	326	F1-13	DO YOU PERFORM TASKS ON VELOCITY RIBBON MICROPHONES	0	0	0	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		DUTIES	SPC 001	SPC 002	SPC 003	
	328	#2-01 IN YOUR PRESENT JOB, DO YOU PERFORM ANY TASKS DEALING WITH SPEAKERS	22	24	17	
	329	#2-02 DO YOU INSPECT SPEAKERS	18	21	13	
	329	#2-03 DO YOU CLEAN SPEAKERS	17	20	13	
	330	#2-04 DO YOU OPERATE SPEAKERS	18	18	17	
	331	#2-05 DO YOU TROUBLESHOOT AS FAR AS CHECKING WIRE CONNECTIONS BUT DO NOT TROUBLESHOOT DOWN TO COMPONENT PARTS OF SPEAKERS	16	18	13	SPEAKERS
	332	#2-06 DO YOU TROUBLESHOOT DOWN TO SPEAKER PARTS	5	6	5	
	333	#2-07 DO YOU REMOVE OR REPLACE COMPLETE SPEAKERS	18	20	15	
	334	#2-08 DO YOU REMOVE OR REPLACE SPEAKER PARTS	2	1	2	
	335	#2-09 DO YOU PERFORM ANY TASKS ON SPEAKER CONES	1	1	0	
	336	#2-10 DO YOU PERFORM ANY TASKS ON SPEAKER SPIDERS	1	0	2	
	337	#2-11 DO YOU PERFORM ANY TASKS ON SPEAKER FIELD COILS	2	1	2	
	338	#2-12 DO YOU PERFORM ANY TASKS ON SPEAKER VOICE COILS	3	3	2	
	339	#2-13 DO YOU PERFORM ANY TASKS ON SPEAKER PERMANENT MAGNETS	1	1	0	
	340	#2-14 DO YOU PERFORM ANY TASKS ON SPEAKER ELECTROMAGNETS	2	1	2	
	341	#2-15 DO YOU PERFORM ANY TASKS ON SPEAKER SOFT IRON CORES	1	1	0	
	342	#3-01 DO YOU USE OSCILLOSCOPES IN YOUR PRESENT JOB	87	92	80	
	343	#3-02 DO YOU USE OSCILLOSCOPES TO PERFORM OPERATIONAL CHECKS	84	90	72	
	344	#3-03 DO YOU USE OSCILLOSCOPES TO PERFORM ALIGNMENTS OR ADJUSTMENTS	87	93	77	
	345	#3-04 DO YOU USE OSCILLOSCOPES TO TROUBLESHOOT ELECTRONIC CIRCUITS	91	96	82	OSCILLOSCOPES
	346	#3-05 DO YOU USE OSCILLOSCOPES TO MEASURE FREQUENCY	85	93	70	
	347	#3-06 DO YOU USE OSCILLOSCOPES TO MEASURE TIME	84	93	67	
	348	#3-07 DO YOU USE OSCILLOSCOPES TO OBSERVE LISAJOUS PATTERNS	32	32	32	
	349	#3-08 DO YOU USE OSCILLOSCOPES TO OBSERVE SIGNALS WHILE UTILIZING ATTENUATOR PROBES	84	94	72	
	350	#3-09 DO YOU USE OSCILLOSCOPES TO MAKE FREQUENCY OR TIME MEASUREMENTS USING DELAY TIME MULTIPLIERS	61	65	55	
	351	#3-10 DO YOU USE OSCILLOSCOPES TO MEASURE AC VOLTAGE	88	94	77	
	352	#3-11 DO YOU USE OSCILLOSCOPES TO MEASURE DB OBSERVE SIGNALS AFTER FIRST ADJUSTING THE GAIN AND DC BAL CONTROLS	66	69	60	
	353	#3-12 DO YOU USE OSCILLOSCOPES TO MEASURE DC VOLTAGE	90	96	80	
	354	#1-01 DO YOU WORK WITH SEMICONDUCTOR DIODES IN YOUR PRESENT JOB	92	96	85	
	355	#1-02 DO YOU INSPECT DIODES	90	93	85	
	356	#1-03 DO YOU REMOVE OR REPLACE DIODES	92	94	88	
	357	#1-04 DO YOU CHECK DIODES USING AN INSTRUMENT	92	94	88	SEMICONDUCTOR DIODES
	358	#1-05 DO YOU USE ENERGY LEVEL DIAGRAMS IN YOUR WORK WITH DIODES	8	10	5	
	359	#1-06 DO YOU USE PN JUNCTION DIODE CHARACTERISTIC CURVES, TOGETHER WITH VALUES OF FORWARD AND REVERSE BIAS VOLTAGE, TO COMPUTE FORWARD OR REVERSE BIAS RESISTANCE	14	15	10	
	360	#1-07 DO YOU COMPUTE FORWARD OR REVERSE BIAS RESISTANCE FOR DIODES	23	25	17	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	BY-TSK	SPC 001	SPC 002	SPC 003
360	G1-08 DO YOU USE OR REFER TO THE GENERAL RULE THAT TEMPERATURE CAN AFFECT THE OPERATION OF DIODES	70	75	63
362	G1-09 DO YOU IDENTIFY SEMICONDUCTOR DIODES AS OPPOSED TO OTHER ELECTRONIC COMPONENTS, SUCH AS RESISTORS, BASED ON THEIR PHYSICAL APPEARANCE	82	89	70
364	G1-10 DO YOU REFER TO OR DO YOU DETERMINE THE GENERAL EFFECTS OF DOPING ON CURRENT FLOW	16	21	7
366	G1-11 DO YOU USE OR REFER TO MEASUREMENTS OF FORWARD BIAS RESISTANCE	72	72	72
368	G1-12 DO YOU USE OR REFER TO DIODE COLOR CODING	37	35	25
368	G1-13 DO YOU USE OR REFER TO CENTRIFUGAL FORCE OF AN ELECTRON IN ORBIT AROUND A NUCLEUS	3	4	0
367	G1-14 DO YOU USE OR REFER TO CENTRIPETAL FORCE OF AN ELECTRON IN ORBIT AROUND A NUCLEUS		4	0
368	G1-15 DO YOU USE OR REFER TO DIODE NUMBERING SYSTEM, SUCH AS IN 538	83	86	77
369	G1-16 DO YOU USE OR REFER TO KINETIC ENERGY OF AN ELECTRON MOVING IN ORBIT	5	8	0
370	G1-17 DO YOU USE OR REFER TO POTENTIAL ENERGY OF AN ELECTRON MOVING IN ORBIT	6	10	0
371	G1-18 DO YOU USE OR REFER TO MEASUREMENTS OF REVERSE BIAS RESISTANCE	71	76	63
372	G1-19 DO YOU USE OR REFER TO NUMBER OF ELECTRONS IN A PARTICULAR SHELL OR ORBIT	7	13	0
373	G1-20 DO YOU USE OR REFER TO PERMISSIBLE ENERGY LEVELS OF AN ORBITING ELECTRON	7	11	0
374	G1-21 DO YOU USE OR REFER TO FORBIDDEN ENERGY LEVELS OF AN ORBITING ELECTRON	7	11	0
375	G1-22 DO YOU USE OR REFER TO VALENCE ELECTRONS (THOSE IN THE OUTERMOST SHELL)	4	11	2
376	G1-23 DO YOU USE OR REFER TO ATOMIC NUMBER (TOTAL NUMBER OF ELECTRONS IN ATOM)	4	11	2
377	G1-24 DO YOU USE OR REFER TO SYMBOLS ON THE DIODE WHICH INDICATE THE CATHODE END	82	86	75
378	G1-25 DO YOU NEED TO KNOW WHICH MATERIALS ARE USED IN THE CONSTRUCTION OF DIODES SUCH AS GERMANIUM OR SILICON	22	23	20
379	G1-26 DO YOU NEED TO KNOW THAT SEMICONDUCTORS HAVE NEGATIVE TEMPERATURE COEFFICIENTS OF RESISTANCE (AS TEMPERATURE INCREASES RESISTANCE DECREASES)	45	54	25
380	G1-27 DO YOU USE OR REFER TO PN JUNCTION DIODE CHARACTERISTIC CURVES, SUCH AS VOLTAGE - CURRENT CHARACTERISTIC CURVES (PERHAPS YOU DO THIS TO IDENTIFY POINTS OF STRUCTURAL BREAKDOWN OR OPERATING REGIONS)	19	23	13
381	G1-28 DO YOU DETERMINE WHETHER PN JUNCTION DIODES ARE FORWARD BIASED OR REVERSE BIASED WHEN YOU READ OR INTERPRET CIRCUIT DIAGRAMS	66	72	60
382	G1-29 DO YOU USE OR REFER TO VALENCE BAND IN SEMICONDUCTOR MATERIALS	9	14	0

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	QT-TSK	SPC 001	SPC 002	SPC 003	
G 383	G1-30 DO YOU USE OR REFER TO FORBIDDEN BAND IN SEMICONDUCTOR MATERIALS	8	13	0	
G 384	G1-31 DO YOU USE OR REFER TO CONDUCTION BAND IN SEMICONDUCTOR MATERIALS	9	14	0	
G 385	G1-32 DO YOU USE OR REFER TO COVALENT BONDING IN SEMICONDUCTOR MATERIALS	8	13	0	
G 386	G1-33 DO YOU USE OR REFER TO ELECTRON-HOLE PAIR CREATED IN SEMICONDUCTORS	10	14	2	
G 387	G1-34 DO YOU USE OR REFER TO ELECTRON FLOW OR HOLE FLOW IN SEMICONDUCTORS	22	27	13	
G 388	G1-35 DO YOU USE OR REFER TO DONOR IMPURITY IN SEMICONDUCTORS	10	15	0	
G 389	G1-36 DO YOU USE OR REFER TO ACCEPTOR IMPURITY IN SEMICONDUCTORS	10	15	0	
G 390	G1-37 DO YOU USE OR REFER TO P-TYPE SEMICONDUCTOR MATERIAL	39	44	30	
G 391	G1-38 DO YOU USE OR REFER TO N-TYPE SEMICONDUCTOR MATERIAL	38	42	30	
G 392	G1-39 DO YOU USE OR REFER TO MAJORITY CARRIERS IN SEMICONDUCTORS	14	20	2	
G 393	G1-40 DO YOU USE OR REFER TO MINORITY CARRIERS IN SEMICONDUCTORS	14	20	2	
G 394	G1-41 DO YOU USE OR REFER TO JUNCTION RECOMBINATION IN SEMICONDUCTORS	10	14	2	
G 395	G1-42 DO YOU USE OR REFER TO DEPLETION REGION IN SEMICONDUCTORS	12	17	2	
G 396	G1-43 DO YOU USE OR REFER TO RELATIONSHIP BETWEEN BARRIER WIDTH AND DIFFERENCE OF POTENTIAL	14	18	5	
G 397	G1-44 DO YOU USE OR REFER TO THE 1011 BACK TO FRONT RESISTANCE RATIO FOR DIODES	72	73	70	
G 398	G1-45 DO YOU USE OR REFER TO BARRIER HEIGHT IN SEMICONDUCTORS	13	18	2	
G 399	G1-46 DO YOU USE OR REFER TO DIODE SUBSTITUTION INFORMATION	53	56	47	
G 400	G1-47 DO YOU USE OR REFER TO MAXIMUM AVERAGE FORWARD CURRENT DIODE RATINGS	32	39	20	
G 401	G1-48 DO YOU USE OR REFER TO PEAK RECURRENT FORWARD CURRENT DIODE RATINGS	26	32	15	
G 402	G1-49 DO YOU USE OR REFER TO MAXIMUM SURGE CURRENT DIODE RATINGS	28	32	20	
G 403	G1-50 DO YOU USE OR REFER TO PEAK REVERSE (INVERSE) VOLTAGE DIODE RATINGS	39	48	22	
G 404	G2-01 DO YOU WORK WITH TRANSISTORS IN YOUR PRESENT JOB.	89	92	85	
G 405	G2-02 DO YOU INSPECT TRANSISTORS	84	86	85	
G 406	G2-03 DO YOU REMOVE OR REPLACE TRANSISTORS	89	90	88	
G 407	G2-04 DO YOU CHECK TRANSISTORS USING AN INSTRUMENT	84	89	82	
G 408	G2-05 DO YOU USE OR REFER TO EMITTER - BASE (EB) FORWARD AND REVERSE RESISTANCE MEASUREMENTS	88	90	85	TRANSISTORS
G 409	G2-06 DO YOU USE OR REFER TO COLLECTOR - BASE (CB) FORWARD AND REVERSE RESISTANCE MEASUREMENTS	84	90	80	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	ITEMS	SPC 001	SPC 002	SPC 003	
6 710	62-07 DO YOU USE OR REFER TO EMITTER - COLLECTOR (EC) RESISTANCE MEASUREMENTS	86	90	80	
6 711	62-08 DO YOU USE OR REFER TO HOW BIASING AFFECTS THE PHYSICAL BARRIER WIDTH OF THE EMITTER - BASE JUNCTION	30	32	25	
6 712	62-09 DO YOU USE OR REFER TO HOW BIASING AFFECTS THE PHYSICAL BARRIER WIDTH OF THE COLLECTOR - BASE JUNCTION	29	31	25	
6 713	62-10 DO YOU USE OR REFER TO THE PHYSICAL SIZE OF THE TRANSISTOR STRUCTURE (COLLECTOR, BASE AND EMITTER)	49	59	30	
6 714	62-11 DO YOU USE OR REFER TO LEAKAGE CURRENT (ICBO) IN A TRANSISTOR	24	28	17	
6 715	62-12 DO YOU USE OR REFER TO TRANSISTOR SCHEMATIC SYMBOLS	86	87	85	
6 716	62-13 DO YOU USE OR REFER TO TRANSISTOR NOTATION SUCH AS Q1, Q2, Q3, ETC	87	90	82	
6 717	62-14 DO YOU USE OR REFER TO TRANSISTOR SUBSTITUTION INFORMATION	61	65	55	
6 718	62-15 DO YOU USE OR REFER TO THE GENERAL RULE THAT THE TRANSISTOR BASE CURRENT IB IS NORMALLY SIGNIFICANTLY SMALLER THAN THE EMITTER CURRENT IE (USUALLY IB BEING 2 TO 8 PERCENT OF IE)	90	96	27	
6 719	62-16 DO YOU USE THE INFORMATION THAT THE EFFECT OF EMITTER BASE VOLTAGE ON BASE CURRENT IS THE CONTROLLING FACTOR FOR TRANSISTORS	51	56	47	
6 720	62-17 DO YOU USE THE GENERAL RULE THAT LEAKAGE CURRENT (ICBO) IN A TRANSISTOR INCREASES AS TEMPERATURE INCREASES	29	35	17	
6 721	62-18 DO YOU USE OR REFER TO TRANSISTOR CHARACTERISTIC CURVES	22	27	13	
6 722	62-19 DO YOU USE OR REFER TO BETA TRANSISTOR GAINS	14	20	5	
6 723	62-20 DO YOU USE OR REFER TO ALPHA TRANSISTOR GAINS	14	18	5	
6 724	62-21 DO YOU USE OR REFER TO GAMMA TRANSISTOR GAINS	13	17	5	
6 725	62-22 DO YOU CALCULATE BETA TRANSISTOR GAINS	10	14	2	
6 726	62-23 DO YOU CALCULATE ALPHA TRANSISTOR GAINS	10	14	2	
6 727	62-24 DO YOU CALCULATE GAMMA TRANSISTOR GAINS	9	13	2	
6 728	63-01 DO YOU WORK WITH TRANSISTOR AMPLIFIERS IN YOUR PRESENT JOB	72	79	60	
6 729	63-02 DO YOU INSPECT TRANSISTOR AMPLIFIERS	67	70	60	
6 730	63-03 DO YOU ALIGN OR ADJUST TRANSISTOR AMPLIFIERS	64	69	55	
6 731	63-04 DO YOU TROUBLESHOOT TO THE AMPLIFIER CIRCUIT LEVEL	69	76	57	TRANSISTOR AMPLIFIERS
6 732	63-05 DO YOU TROUBLESHOOT TO AMPLIFIER COMPONENTS	70	76	60	
6 733	63-06 DO YOU REMOVE OR REPLACE THE COMPLETE AMPLIFIER	62	66	55	
6 734	63-07 DO YOU REMOVE OR REPLACE AMPLIFIER COMPONENTS	71	77	60	
6 735	63-08 DO YOU USE OR REFER TO (COMMON EMITTER) THE CHANGE IN COLLECTOR CURRENT WHICH RESULTS FROM A CHANGE IN BASE CURRENT	43	52	27	
6 736	63-09 DO YOU USE OR REFER TO (COMMON EMITTER) THE CALCULATIONS NECESSARY TO MEASURE THE SPECIFIC CHANGE IN COLLECTOR CURRENT WHICH RESULTS FROM A SPECIFIC CHANGE IN BASE CURRENT	15	23	2	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	QY-TSK	SPC 001	SPC 002	SPC 003
6 937	63-10 DO YOU USE OR REFER TO (COMMON EMITTER) THE CHANGE IN COLLECTOR VOLTAGE WHICH RESULTS FROM A CHANGE IN BASE CURRENT	91	99	25
6 938	63-11 DO YOU USE OR REFER TO (COMMON EMITTER) THE CALCULATIONS NECESSARY TO MEASU E THE SPECIFIC CHANGE IN COLLECTOR VOLTAGE WHICH RESULTS FROM A SPECIFIC CHANGE IN BASE CURRENT	18	28	0
6 939	63-12 DO YOU USE OR REFER TO (COMMON EMITTER) THE CHANGE IN BASE CURRENT WHICH RESULTS FROM AN INPUT SIGNAL	92	99	30
6 940	63-13 DO YOU USE OR REFER TO (COMMON EMITTER) THE CALCULATIONS NECESSARY TO MEASURE THE SPECIFIC CHANGE IN BASE CURRENT WHICH RESULTS FROM A SPECIFIC INPUT SIGNAL	19	27	5
6 941	63-14 DO YOU USE THE LOAD-LINE METHOD OF ANALYSIS IN YOUR CIRCUIT ANALYSIS (THIS METHOD REQUIRES YOU TO PLOT A LOAD-LINE ON A TRANSISTOR CHARACTERISTIC CURVE)	8	10	0
6 942	63-15 DO YOU USE OR REFER TO THE OPERATING POINT @ (QUIESCENT POINT) FOR A TRANSISTOR	25	31	15
6 943	63-16 DO YOU CALCULATE THE SPECIFIC QUIESCENT POINT FOR A PARTICULAR TRANSISTOR	9	14	0
6 944	63-17 DO YOU MEASURE VOLTAGE GAIN USED IN THE COMMON EMITTER CONFIGURATION	54	58	47
6 945	63-18 DO YOU MEASURE CURRENT GAIN USED IN THE COMMON EMITTER CONFIGURATION	41	45	32
6 946	63-19 DO YOU MEASURE POWER GAIN USED IN THE COMMON EMITTER CONFIGURATION	34	38	27
6 947	63-20 DO YOU CALCULATE THE VOLTAGE GAIN FOR SPECIFIC TRANSISTORS USING A FORMULA THAT IS, DO YOU DIVIDE THE CHANGE IN BASE-EMITTER VOLTAGE INTO THE CHANGE THE BASE COLLECTOR VOLTAGE TO DETERMINE THE VOLTAGE GAIN	16	23	5
6 948	63-21 DO YOU CALCULATE THE CURRENT GAIN FOR SPECIFIC TRANSISTORS USING A FORMULA THAT IS, DO YOU DIVIDE THE CHANGE IN BASE CURRENT INTO THE CHANGE IN COLLECTOR CURRENT TO DETERMINE THE CURRENT GAIN	13	18	2
6 949	63-22 DO YOU CALCULATE THE POWER GAIN FOR A SPECIFIC TRANSISTOR USING A FORMULA THAT IS, DO YOU MULTIPLY THE CURRENT GAIN TIMES THE VOLTAGE GAIN TO DETERMINE THE POWER GAIN	12	17	2
6 950	63-23 DO YOU NEED TO KNOW THAT MORE COLLECTOR CURRENT IS GENERATED WITH LESS COLLECTOR VOLTAGE AS TEMPERATURE INCREASES (THIS AFFECTS THE STATIC OPERATING POINT (Q) OF THE TRANSISTOR)	18	23	5
6 951	63-24 DO YOU COMPUTE THE STATIC OPERATING POINT (Q) OF A TRANSISTOR AT DIFFERENT TEMPERATURES	7	11	0
952	63-25 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH EMITTER (SWAMPING) RESISTOR STABILIZATION	41	48	27
953	63-26 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH SELF-BIAS STABILIZATION	35	46	25

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	QY-TSK	SPC 001	SPC 002	SPC 003
G 954	G3-27 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH THERMISTOR STABILIZATION	33	42	17
G 955	G3-28 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH FORWARD BIAS DIODE STABILIZATION	41	51	25
G 956	G3-29 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH REVERSE BIAS DIODE STABILIZATION	41	51	25
G 957	G3-30 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH DOUBLE DIODE STABILIZATION	31	37	20
G 958	G3-31 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM EMITTER (SWAMPING) RESISTOR STABILIZATION	48	55	35
G 959	G3-32 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM SELF-BIAS STABILIZATION	46	54	32
G 960	G3-33 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM THERMISTOR STABILIZATION	39	45	27
G 961	G3-34 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM FORWARD BIAS DIODE STABILIZATION	46	54	32
G 962	G3-35 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM REVERSE BIAS DIODE STABILIZATION	46	54	32
G 963	G3-36 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM DOUBLE DIODE STABILIZATION	35	39	27
G 964	G3-37 DO YOU IDENTIFY AMPLITUDE DISTORTION FOR TRANSISTOR CIRCUITS	39	46	25
G 965	G3-38 DO YOU TROUBLESHOOT TRANSISTOR CIRCUITS TO FIND THE CAUSES OF AMPLITUDE DISTORTION	43	52	27
G 966	G3-39 DO YOU IDENTIFY FREQUENCY DISTORTION FOR TRANSISTOR CIRCUITS	38	45	25
G 967	G3-40 DO YOU IDENTIFY PHASE DISTORTION FOR TRANSISTOR CIRCUITS	36	44	22
G 968	G3-41 DO YOU TROUBLESHOOT TRANSISTOR CIRCUITS TO FIND THE CAUSES OF PHASE DISTORTION	33	39	22
G 969	G3-42 DO YOU TROUBLESHOOT TRANSISTOR CIRCUITS TO FIND THE CAUSES OF FREQUENCY DISTORTION	37	42	27
G 970	G3-43 DO YOU NEED TO KNOW THE DEGENERATIVE EFFECTS ON THE CIRCUIT CAUSED BY CHANGING EMITTER RESISTANCE FOR TRANSISTOR AMPLIFIERS IN THE COMMON COLLECTOR CONFIGURATION	30	34	22
G 971	G3-44 DO YOU DETERMINE THE CLASS OF OPERATION FOR AMPLIFIERS IN ORDER TO TROUBLESHOOT AMPLIFIER CIRCUITS	36	44	22
G 972	G3-45 DO YOU TROUBLESHOOT OR REPAIR PARAPHASE AMPLIFIERS	52	61	38
G 973	G3-46 DO YOU TROUBLESHOOT OR REPAIR PUSH-PULL AMPLIFIERS	64	73	47
G 974	G3-47 DO YOU TROUBLESHOOT OR REPAIR COMPLEMENTARY SYMMETRY CIRCUITS	32	38	22
G 975	G3-48 DO YOU TROUBLESHOOT OR REPAIR COMPOUND-CONNECTED AMPLIFIERS	36	38	32

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DUTYS	SPC 001	SPC 002	SPC 003	
476	63-09 DO YOU TROUBLESHOOT OR REPAIR CASCADE-CONNECTED AMPLIFIERS	52	61	38	
477	M1-01 DO YOU USE OR REFER TO VARACTORS	44	51	32	
478	M1-02 DO YOU USE OR REFER TO TUNNEL DIODES	52	62	35	
479	M1-03 DO YOU USE OR REFER TO FIELD EFFECT TRANSISTORS (FET)	47	52	38	SOLID-STATE SPECIAL PURPOSE DEVICES
480	M1-04 DO YOU USE OR REFER TO UNIJUNCTION TRANSISTORS	38	44	27	
481	M1-05 DO YOU USE OR REFER TO ZENER DIODES	89	90	88	
482	M1-06 DO YOU USE OR REFER TO INTEGRATED CIRCUITS	54	54	55	
483	M2-01 IN YOUR PRESENT JOB, DO YOU WORK WITH POWER SUPPLIES	94	94	92	
484	M2-02 DO YOU INSPECT POWER SUPPLIES	95	94	92	
485	M2-03 DO YOU CLEAN POWER SUPPLIES	94	93	95	
486	M2-04 DO YOU ALIGN OR ADJUST POWER SUPPLIES	95	94	95	
487	M2-05 DO YOU TROUBLESHOOT TO POWER SUPPLY CIRCUIT LEVEL	95	94	92	
488	M2-06 DO YOU TROUBLESHOOT TO POWER SUPPLY COMPONENTS	95	96	95	
489	M2-07 DO YOU REMOVE OR REPLACE COMPLETE POWER SUPPLIES	87	89	85	
490	M2-08 DO YOU REMOVE OR REPLACE POWER SUPPLY COMPONENTS	95	94	95	
491	M2-09 DO YOU WORK WITH HALF-WAVE RECTIFIERS	85	86	82	
492	M2-10 DO YOU WORK WITH FULL-WAVE RECTIFIERS OTHER THAN BRIDGE RECTIFIERS	87	89	85	
493	M2-11 DO YOU WORK WITH BRIDGE RECTIFIERS	90	93	85	
494	M2-12 DO YOU WORK WITH THREE-PHASE RECTIFIERS	26	28	22	
495	M2-13 DO YOU USE OR REFER TO INPUT VOLTAGE	93	94	90	
496	M2-14 DO YOU USE OR REFER TO INPUT FREQUENCY	60	65	52	POWER SUPPLIES
497	M2-15 DO YOU USE OR REFER TO PEAK OUTPUT VOLTAGE	74	77	67	
498	M2-16 DO YOU USE OR REFER TO AVERAGE OUTPUT VOLTAGE	79	82	75	
499	M2-17 DO YOU USE OR REFER TO RIPPLE AMPLITUDE	63	66	57	
500	M2-18 DO YOU USE OR REFER TO RIPPLE FREQUENCY	53	58	45	
501	M2-19 DO YOU USE OR REFER TO PEAK REVERSE (INVERSE) VOLTAGE	49	55	38	
502	M2-20 DO YOU USE OR REFER TO SHAPE OF OUTPUT WAVEFORMS	74	85	55	
503	M2-21 DO YOU USE OR REFER TO EFFECTIVE OUTPUT VOLTAGE	80	84	70	
504	M2-22 DO YOU WORK WITH CIRCUITS WHICH EMPLOY CAPACITIVE FILTERS	86	90	80	
505	M2-23 DO YOU WORK WITH CIRCUITS WHICH EMPLOY INDUCTIVE FILTERS	86	90	77	
506	M2-24 DO YOU WORK WITH CIRCUITS WHICH EMPLOY CAPACITIVE INPUT L-TYPE FILTERS	79	86	67	
507	M2-25 DO YOU WORK WITH CIRCUITS WHICH EMPLOY INDUCTIVE INPUT L-TYPE FILTERS	80	86	70	
508	M2-26 DO YOU WORK WITH CIRCUITS WHICH EMPLOY LC PI-TYPE FILTERS	77	85	63	
509	M2-27 DO YOU WORK WITH CIRCUITS WHICH EMPLOY RC PI-TYPE FILTERS	77	86	63	
510	M2-28 DO YOU WORK WITH CIRCUITS WHICH EMPLOY DON'T REMEMBER WHICH TYPE OF FILTER	19	20	17	
511	M2-29 DO YOU HAVE THE OPTION OF REPLACING ONE TYPE OF FILTER WITH A DIFFERENT TYPE FILTER	4	4	2	
512	M3-01 DO YOU WORK WITH OSCILLATORS IN YOUR PRESENT JOB	76	79	70	OSCILLATORS

TASK GROUP SUMMARY
PERCENT MEMBERS RESPONDING

	ITEM	SPC 001	SPC 002	SPC 003	
M 513	M3-02 DO YOU INSPECT OSCILLATORS	71	73	67	
M 514	M3-03 DO YOU ALIGN OR ADJUST OSCILLATORS	64	70	52	
M 515	M3-04 DO YOU REMOVE OR REPLACE COMPLETE OSCILLATORS	65	72	65	
M 516	M3-05 DO YOU REMOVE OR REPLACE OSCILLATOR COMPONENTS	68	72	63	
M 517	M3-06 DO YOU TROUBLESHOOT TO OSCILLATOR CIRCUIT LEVEL	74	77	67	
M 518	M3-07 DO YOU TROUBLESHOOT TO OSCILLATOR COMPONENTS	71	73	67	
M 519	M3-08 DO YOU USE OR REFER TO FEEDBACK	66	69	60	
M 520	M3-09 DO YOU USE OR REFER TO FREQUENCY DETERMINING DEVICES (FDD)	63	72	47	
M 521	M3-10 DO YOU USE OR REFER TO AMPLITUDE STABILITY	54	59	45	
M 522	M3-11 DO YOU USE OR REFER TO FREQUENCY STABILITY	57	61	50	
M 523	M3-12 DO YOU USE OR REFER TO DAMPING	66	75	50	
M 524	M3-13 DO YOU USE OR REFER TO REGENERATIVE FEEDBACK	62	68	52	
M 25	M3-14 DO YOU USE OR REFER TO PIEZOELECTRIC EFFECT	24	30	20	
M 526	M3-15 DO YOU USE OR REFER TO CRITICAL DAMPING	41	51	25	
M 527	M3-16 DO YOU USE OR REFER TO UNDER DAMPING	48	61	25	
M 528	M3-17 DO YOU USE OR REFER TO OVER DAMPING	48	61	25	
M 529	M3-18 DO YOU WORK WITH OSCILLATORS WHICH USE LC TANK CIRCUITS AS FDD	58	68	40	
M 530	M3-19 DO YOU WORK WITH OSCILLATORS WHICH USE RC NETWORKS AS FDD	62	70	47	
M 531	M3-20 DO YOU WORK WITH OSCILLATORS WHICH USE CRYSTALS AS FDD	59	68	42	
M 532	M3-21 DO YOU WORK WITH OSCILLATORS WHICH USE DON'T REMEMBER WHICH TYPE OF FDD	13	10	17	
M 533	M3-22 DO YOU WORK WITH SERIES HARTLEY SINUSOIDAL OSCILLATORS	39	44	30	
M 534	M3-23 DO YOU WORK WITH SHUNT HARTLEY SINUSOIDAL OSCILLATORS	37	42	27	
M 535	M3-24 DO YOU WORK WITH COLPITTS SINUSOIDAL OSCILLATORS	41	44	35	
M 536	M3-25 DO YOU WORK WITH CLAPP SINUSOIDAL OSCILLATORS	31	39	15	
M 537	M3-26 DO YOU WORK WITH BUTLER SINUSOIDAL OSCILLATORS	27	35	13	
M 538	M3-27 DO YOU WORK WITH DON'T REMEMBER WHICH TYPE OF OSCILLATORS	32	30	38	
I 539	I1-01 DO YOU WORK WITH MULTIVIBRATORS IN YOUR PRESENT JOB	74	83	57	
I 540	I1-02 DO YOU INSPECT WAVE GENERATING OR SHAPING CIRCUITS	65	75	47	
I 541	I1-03 DO YOU ALIGN OR ADJUST WAVE GENERATING OR SHAPING CIRCUITS	63	75	42	
I 542	I1-04 DO YOU CALIBRATE WAVE GENERATING OR SHAPING CIRCUITS	59	69	42	
I 543	I1-05 DO YOU TROUBLESHOOT TO WAVE GENERATING OR SHAPING CIRCUITS	67	75	52	MULTIVIBRATORS
I 544	I1-06 DO YOU TROUBLESHOOT TO WAVE GENERATING OR SHAPING CIRCUIT COMPONENTS	73	82	57	
I 545	I1-07 DO YOU REMOVE OR REPLACE COMPLETE WAVE GENERATING OR SHAPING CIRCUITS	59	63	52	
I 546	I1-08 DO YOU REMOVE OR REPLACE WAVE GENERATING OR SHAPING COMPONENTS	68	76	55	
I 547	I1-09 DO YOU WORK WITH MULTIVIBRATORS WHICH CONTAIN LC TANK CIRCUITS	55	61	45	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		DY-YSR	SPC 001	SPC 002	SPC 003	
548	11-10	DO YOU WORK WITH MULTIVIBRATORS WHICH CONTAIN RC NETWORKS	59	65	47	
549	11-11	DO YOU WORK WITH MULTIVIBRATORS WHICH CONTAIN CRYSTALS	49	51	45	
550	11-12	DO YOU WORK WITH MULTIVIBRATORS WHICH CONTAIN DON'T REMEMBER WHICH TYPE OF FOO	15	20	7	
551	11-13	DO YOU WORK WITH ASTABLE MULTIVIBRATORS	66	72	55	
552	11-14	DO YOU WORK WITH MONOSTABLE MULTIVIBRATORS	68	75	57	
553	11-15	DO YOU WORK WITH BISTABLE MULTIVIBRATORS	68	75	57	
554	11-16	DO YOU WORK WITH DON'T REMEMBER WHICH TYPE MULTIVIBRATORS	9	11	5	
555	12-01	DO YOU WORK WITH LIMITERS OR CLAMPERS IN YOUR PRESENT JOB	66	77	45	
556	12-02	DO YOU WORK WITH SERIES DIODE LIMITERS	56	65	40	
557	12-03	DO YOU WORK WITH SHUNT DIODE LIMITERS	54	62	40	
558	12-04	DO YOU WORK WITH LIMITERS WITH BIAS	50	58	38	
559	12-05	DO YOU WORK WITH ZENER DIODE LIMITERS	59	65	47	LIMITERS AND CLAMPERS
560	12-06	DO YOU WORK WITH TRANSISTOR LIMITERS	49	55	38	
561	12-07	DO YOU WORK WITH DON'T KNOW WHICH TYPE OF LIMITERS	10	13	5	
562	12-08	DO YOU WORK WITH BASIC DIODE CLAMPING CIRCUITS	56	65	40	
563	12-09	DO YOU WORK WITH DIODE CLAMPING CIRCUITS WITH BIAS	52	59	40	
564	12-10	DO YOU WORK WITH DON'T KNOW WHICH TYPE OF CLAMPING CIRCUIT	12	15	5	
565	13-01	IN YOUR PRESENT JOB, DO YOU WORK ON EQUIPMENT WHICH CONTAINS ELECTRON TUBES	89	94	80	
566	13-02	DO YOU CHECK ELECTRON TUBES TO SEE IF THEY ARE GOOD	86	90	77	
567	13-03	DO YOU USE TUBE TESTERS TO CHECK ELECTRON TUBES	79	89	63	
568	13-04	DO YOU USE MULTIMETERS TO CHECK ELECTRON TUBES	81	87	70	
569	13-05	DO YOU USE SCOPES TO CHECK ELECTRON TUBES	68	82	42	
570	13-06	DO YOU USE SUBSTITUTION TO CHECK ELECTRON TUBES	81	85	75	
571	13-07	DO YOU USE OR REFER TO CUTOFF	68	85	38	
572	13-08	DO YOU USE OR REFER TO PEAK INVERSE VOLTAGE RATING	25	31	15	
573	13-09	DO YOU USE OR REFER TO PEAK CURRENT RATING	30	37	17	ELECTRON TUBES
574	13-10	DO YOU USE OR REFER TO TRANSIT TIME	26	32	15	
575	13-11	DO YOU USE OR REFER TO PLATE DISSIPATION RATING	21	25	13	
576	13-12	DO YOU USE OR REFER TO SATURATION	72	87	45	
577	13-13	DO YOU USE OR REFER TO DC PLATE RESISTANCE	44	52	30	
578	13-14	DO YOU COMPUTE ACTUAL VALUES OF THE DC PLATE RESISTANCE FOR ELECTRON TUBES	12	15	5	
579	13-15	DO YOU USE OR REFER TO PLATE VOLTAGE	86	92	77	
580	13-16	DO YOU USE OR REFER TO PLATE CURRENT	64	72	50	
581	13-17	DO YOU USE OR REFER TO GRID VOLTAGE	86	92	77	
582	13-18	DO YOU USE OR REFER TO GRID CURRENT	64	73	47	
583	13-19	DO YOU USE OR REFER TO CATHODE VOLTAGE	86	92	77	
584	13-20	DO YOU USE OR REFER TO CATHODE CURRENT	65	75	47	
585	13-21	DO YOU USE OR REFER TO THE TRIODE AMPLIFICATION FACTOR (THE AMPLIFICATION FACTOR FOR TRIODES IS DEFINED AS THE RATIO OF CHANGE IN PLATE VOLTAGE TO A CHANGE IN GRID VOLTAGE)	24	37	13	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		QY-TSK	SPC 001	SPC 002	SPC 003	
I	586	J3-22 DO YOU CALCULATE ACTUAL VALUES OF TRIODE AMPLIFICATION FACTORS	8	11	2	
I	587	J3-23 DO YOU USE OR REFER TO MULTIGRID (TETRODE, PENTODE, ETC) AMPLIFICATION FACTORS	24	32	15	
I	588	J3-24 DO YOU USE OR REFER TO ELECTRON TUBE TRANSCONDUCTANCE (GM WHICH IS MEASURED IN MMOS)	11	15	2	
I	589	J3-25 DO YOU CALCULATE ACTUAL VALUES OF ELECTRON TUBE TRANSCONDUCTANCES	4	6	0	
I	590	J3-26 DO YOU USE OR REFER TO THE ELECTRON TUBE PARAMETER CALLED AC PLATE RESISTANCE	12	15	5	
I	591	J3-27 DO YOU CALCULATE ACTUAL VALUES OF AC PLATE RESISTANCE	6	7	5	
I	592	J3-28 DO YOU USE OR REFER TO ELECTRON TUBE INTERELECTRODE CAPACITANCE	40	48	25	
I	593	J3-29 DO YOU USE OR REFER TO CHARACTERISTIC CURVES IN YOUR WORK WITH ELECTRON TUBES	15	24	0	
I	594	J3-30 DO YOU USE CHARACTERISTIC CURVES TO SELECT PLATE VOLTAGE FOR A SPECIFIED BIAS	13	18	2	
I	595	J3-31 DO YOU USE CHARACTERISTIC CURVES TO SELECT PLATE CURRENT FOR A SPECIFIED BIAS	11	17	0	
I	596	J3-32 DO YOU USE CHARACTERISTIC CURVES TO SELECT BIAS REQUIRED FOR CUTOFF	15	21	5	
I	597	J3-33 DO YOU USE CHARACTERISTIC CURVES TO SELECT BIAS REQUIRED FOR SATURATION	15	21	5	
I	598	J3-34 DO YOU USE OR REFER TO ELECTRON TUBE AMPLIFIER GAIN	66	76	47	
I	599	J3-35 DO YOU USE OR REFER TO ELECTRON TUBE AMPLIFIER EFFICIENCY	43	56	20	
I	600	J3-36 DO YOU USE TEST TUBE CHECKERS TO DETERMINE ELECTRON TUBE AMPLIFIER GAIN	59	63	50	
I	601	J3-37 DO YOU USE MULTIMETERS TO DETERMINE ELECTRON TUBE AMPLIFIER GAIN	59	66	47	
I	602	J3-38 DO YOU USE OSCILLOSCOPES TO DETERMINE ELECTRON TUBE AMPLIFIER GAIN	59	72	38	
I	603	J3-39 DO YOU USE CHARACTERISTIC CURVES TO DETERMINE ELECTRON TUBE AMPLIFIER GAIN	14	15	10	
I	604	J3-40 DO YOU CALCULATE ANY ELECTRON TUBE CAPACITANCES SUCH AS INPUT CAPACITANCE	5	8	0	
I	605	J3-41 DO YOU USE OR REFER TO TUBE SOCKET NOTATION	86	90	77	
I	606	J3-42 DO YOU USE OR REFER TO PIN NUMBERING SYSTEMS	88	93	80	
I	607	J3-43 DO YOU USE OR REFER TO THE TYPE OF MATERIAL OR THE OPERATING TEMPERATURE OF THE EMITTING SURFACE IN THE ELECTRON TUBES YOU WORK ON	10	15	0	
I	608	J3-44 DO YOU USE OR REFER TO TUBE SUBSTITUTION MATERIAL SUCH AS MANUALS OR CHARTS	59	69	40	
J	609	J1-01 DO YOU WORK WITH ELECTRON TUBE AMPLIFIERS OR CIRCUITS IN YOUR PRESENT JOB	82	89	70	ELECTRON TUBE AMPLIFIERS AND CIRCUITS
J	610	J1-02 DO YOU DETERMINE THE CLASS OF OPERATION FOR ELECTRON TUBE AMPLIFIERS IN ORDER TO TROUBLESHOOT AMPLIFIER CIRCUITS	39	46	25	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	BY-TSK	SPC 001	SPC 002	SPC 003	
J 611	J1-03 DO YOU TROUBLESHOOT OR REPAIR PARAPHASE AMPLIFIERS	56	68	35	
J 612	J1-04 DO YOU TROUBLESHOOT OR REPAIR PUSH-PULL AMPLIFIERS	67	77	47	
J 613	J1-05 DO YOU TROUBLESHOOT OR REPAIR COMPOUND-CONNECTED AMPLIFIERS	40	46	27	
J 614	J1-06 DO YOU TROUBLESHOOT OR REPAIR CASCADE-CONNECTED AMPLIFIERS	53	63	35	
J 615	J1-07 DO YOU TROUBLESHOOT OR REPAIR DON'T KNOW WHICH TYPE OF AMPLIFIER	25	27	22	
J 616	J2-01 DO YOU WORK WITH GAS TUBES (HOT CATHODE OR COLD CATHODE)	78	89	60	
J 617	J2-02 DO YOU WORK WITH CATHODE-RAY TUBES	87	93	77	
J 618	J2-03 DO YOU USE OR REFER TO THE CHARACTERISTICS OF BEAM POWER TUBES	18	27	2	
J 619	J2-04 DO YOU TROUBLESHOOT OR REPAIR CIRCUITS IN WHICH BEAM POWER TUBES ARE USED	29	38	13	
J 620	J2-05 DO YOU USE OR REFER TO THE CHARACTERISTICS OF THYRATRONS	54	68	40	
J 621	J2-06 DO YOU TROUBLESHOOT OR REPAIR CIRCUITS IN WHICH THYRATRONS ARE USED	79	89	63	SPECIAL PURPOSE ELECTRON TUBES
J 622	J2-07 DO YOU USE OR REFER TO THE PRINCIPLES OF OPERATION OF ELECTRON GUNS OF CATHODE-RAY TUBES (CRT)	48	54	38	
J 623	J2-08 DO YOU USE OR REFER TO THE PRINCIPLES OF OPERATION OF ELECTROMAGNETIC DEFLECTION SYSTEMS OF CATHODE-RAY TUBES (CRT)	63	70	50	
J 624	J2-09 DO YOU USE OR REFER TO THE PRINCIPLES OF OPERATION OF ELECTROSTATIC DEFLECTION SYSTEMS OF CATHODE-RAY TUBES (CRT)	55	65	38	
J 625	J2-10 DO YOU USE OR REFER TO PHOSPHOR SCREENS	70	79	55	
J 626	J2-11 DO YOU USE OR REFER TO AQUADAG COATINGS	59	72	38	
J 627	J2-12 DO YOU USE OR REFER TO ELECTRON OPTICS	19	24	10	
J 628	J2-13 DO YOU USE OR REFER TO PERSISTENCE	31	34	25	
J 629	J2-14 DO YOU USE OR REFER TO DECAY TIMES	30	38	15	
J 630	J2-15 DO YOU USE OR REFER TO FLUORESCENCE	43	58	17	
J 631	J2-16 DO YOU USE OR REFER TO PHOSPHORESCENCE	54	65	35	
J 632	J3-01 DO YOU WORK ON TRANSMIT OR RECEIVE SYSTEMS IN YOUR PRESENT JOB	59	75	30	
J 633	J3-02 DO YOU PERFORM TASKS ON FREQUENCY CONVERTERS	46	56	27	
J 634	J3-03 DO YOU PERFORM TASKS ON FREQUENCY MIXERS	56	69	32	HETERODYNING, MODULATION AND DEMODULATION
J 635	J3-04 DO YOU USE OR REFER TO THE HETERODYNING OF SIGNALS IN YOUR WORK WITH TRANSMIT OR RECEIVE SYSTEMS	42	52	25	
J 636	J3-05 DO YOU PERFORM TASKS ON REACTANCE MODULATORS	27	34	15	
J 637	J3-06 DO YOU PERFORM TASKS ON MODULATED OSCILLATORS	40	45	30	
J 638	J1-01 DO YOU WORK ON AM TRANSMIT OR RECEIVE SYSTEMS IN YOUR PRESENT JOB	21	24	15	
J 639	J1-02 DO YOU INSPECT AM TRANSMIT OR RECEIVE SYSTEMS	21	23	17	
J 640	J1-03 DO YOU CLEAN AM TRANSMIT OR RECEIVE SYSTEMS	21	23	17	AM SYSTEMS
J 641	J1-04 DO YOU ALIGN OR ADJUST AM TRANSMIT OR RECEIVE SYSTEMS	21	23	17	

PCT TASKS RESPONDING 'YES' BY SELECTED GRPS — OPSUM1 PAGE 24

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DUTY-TASK	SPC 001	SPC 002	SPC 003	
662	C1-05 DO YOU TROUBLESHOOT TO AM TRANSMIT OR RECEIVE SYSTEMS	21	23	17	
663	C1-06 DO YOU TROUBLESHOOT TO AM TRANSMIT OR RECEIVE COMPONENTS	21	23	17	
664	C1-07 DO YOU REMOVE OR REPLACE AM TRANSMIT OR RECEIVE SYSTEMS	20	21	17	
665	C1-08 DO YOU REMOVE OR REPLACE AM TRANSMIT OR RECEIVE COMPONENTS	21	23	17	
666	C1-09 DO YOU PERFORM TASKS ON RF OSCILLATORS	22	24	17	
667	C1-10 DO YOU PERFORM TASKS ON RF AMPLIFIERS	21	23	17	
668	C1-11 DO YOU PERFORM TASKS ON AUDIO AMPLIFIERS	22	24	17	
669	C1-12 DO YOU PERFORM TASKS ON POWER AMPLIFIERS	21	23	17	
670	C1-13 DO YOU PERFORM TASKS ON LOCAL OSCILLATORS	22	24	17	
671	C1-14 DO YOU PERFORM TASKS ON IF AMPLIFIERS	22	24	17	
672	C1-15 DO YOU PERFORM TASKS ON DETECTORS	21	23	17	
673	C1-16 DO YOU PERFORM TASKS ON DON'T REMEMBER WHICH AM STAGE	3	3	2	
674	C1-17 DO YOU USE OR REFER TO AMPLITUDE STABILIZATION IN TRANSMITTERS	15	14	17	
675	C1-18 DO YOU USE OR REFER TO FREQUENCY STABILIZATION IN TRANSMITTERS	18	18	17	
676	C1-19 DO YOU USE OR REFER TO SENSITIVITY OF RECEIVERS	23	27	17	
677	C1-20 DO YOU USE OR REFER TO SELECTIVITY OF RECEIVERS	22	24	17	
678	C1-21 DO YOU USE OR REFER TO 2.D HARMONIC DISTORTION	14	15	10	
679	C1-22 DO YOU USE OR REFER TO BANDPASS DISTORTION	16	18	13	
680	C1-23 DO YOU USE OR REFER TO SQUARE LAW DISTORTION	4	4	2	
681	C1-24 DO YOU USE OR REFER TO CO-CHANNEL INTERFERENCE	3	4	0	
682	C1-25 DO YOU USE OR REFER TO IMAGE FREQUENCIES IN RECEIVERS	7	7	7	
683	C1-26 DO YOU USE OR REFER TO SIGNAL TO IMAGE RATIOS OR IMAGE REJECTION RATIOS	5	4	5	
684	C1-27 DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH AM TRANSMITTER SCHEMATIC DIAGRAMS	18	20	15	
685	C1-28 DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH AM RECEIVER SCHEMATIC DIAGRAMS	22	24	17	
686	C2-01 DO YOU WORK WITH FM TRANSMIT OR RECEIVE SYSTEMS IN YOUR PRESENT JOB	31	31	30	
687	C2-02 DO YOU INSPECT FM TRANSMIT OR RECEIVE SYSTEMS	30	30	30	
688	C2-03 DO YOU CLEAN FM TRANSMIT OR RECEIVE SYSTEMS	30	30	30	
689	C2-04 DO YOU ALIGN FM TRANSMIT OR RECEIVE SYSTEMS	30	30	30	FM SYSTEMS
690	C2-05 DO YOU TROUBLESHOOT TO FM TRANSMIT OR RECEIVE SYSTEMS	30	30	30	
691	C2-06 DO YOU TROUBLESHOOT TO FM TRANSMIT OR RECEIVE COMPONENTS	30	30	30	
692	C2-07 DO YOU REMOVE OR REPLACE FM TRANSMIT OR RECEIVE SYSTEMS	24	21	30	
693	C2-08 DO YOU REMOVE OR REPLACE FM TRANSMIT OR RECEIVE COMPONENTS	30	30	30	
694	C2-09 DO YOU PERFORM TASKS ON AUDIO AMPLIFIERS	26	25	27	
695	C2-10 DO YOU PERFORM TASKS ON FREQUENCY MULTIPLIERS	25	24	27	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		QY-TSK	SPC 001	SPC 002	SPC 003	
K 676	K2-11	DO YOU PERFORM TASKS ON DRIVERS (INTERMEDIATE AMPLIFIERS)	29	28	30	
K 677	K2-12	DO YOU PERFORM TASKS ON POWER AMPLIFIERS	29	28	30	
K 678	K2-13	DO YOU PERFORM TASKS ON RF AMPLIFIERS	28	27	30	
K 679	K2-14	DO YOU PERFORM TASKS ON FREQUENCY CONVERTERS	28	27	30	
K 680	K2-15	DO YOU PERFORM TASKS ON IF AMPLIFIERS	29	28	30	
K 681	K2-16	DO YOU PERFORM TASKS ON LIMITERS	29	28	30	
K 682	K2-17	DO YOU PERFORM TASKS ON FREQUENCY DISCRIMINATORS	28	27	30	
K 683	K2-18	DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH SCHEMATIC DIAGRAMS OF FM TRANSMITTERS	25	30	17	
K 684	K2-19	DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH SCHEMATIC DIAGRAMS OF FM RECEIVERS	29	30	27	
K 685	K3-01	DO YOU CONVERT DECIMAL (BASE 10) NUMBERS TO OCTAL (BASE 8) NUMBERS	10	11	7	
K 686	K3-02	DO YOU CONVERT DECIMAL NUMBERS TO BINARY (BASE 2) NUMBERS	44	44	45	
K 687	K3-03	DO YOU CONVERT OCTAL NUMBERS TO DECIMAL NUMBERS	9	11	5	
K 688	K3-04	DO YOU CONVERT OCTAL NUMBERS TO BINARY NUMBERS	10	13	5	NUMBERING SYSTEMS
K 689	K3-05	DO YOU CONVERT BINARY NUMBERS TO DECIMAL NUMBERS	46	51	38	
K 690	K3-06	DO YOU CONVERT BINARY NUMBERS TO OCTAL NUMBERS	10	13	5	
K 691	K3-07	DO YOU ADD BINARY NUMBERS TO GET A SUM	41	44	35	
K 692	K3-08	DO YOU SUBTRACT BINARY NUMBERS USING THE END-AROUND-CARRY METHOD	30	34	22	
K 693	K3-09	DO YOU SUBTRACT BINARY NUMBERS USING THE DIRECT SUBTRACTION METHOD	31	34	25	
K 694	K3-10	DO YOU ADD OCTAL NUMBERS TO GET A SUM	8	10	5	
L 695	L1-01	IN YOUR PRESENT JOB, DO YOU PERFORM ANY TASKS RELATING TO LOGIC FUNCTIONS	54	62	40	
L 696	L1-02	DO YOU CONSTRUCT TRUTH TABLES FOR AND LOGIC SYMBOLS OR GATES	27	34	15	
L 697	L1-03	DO YOU CONSTRUCT TRUTH TABLES FOR OR LOGIC SYMBOLS OR GATES	27	34	15	
L 698	L1-04	DO YOU CONSTRUCT TRUTH TABLES FOR AND OR OR LOGIC SYMBOLS WITH STATE INDICATORS	24	32	10	
L 699	L1-05	DO YOU CONSTRUCT TRUTH TABLES FOR EXCLUSIVE OR LOGIC SYMBOLS OR GATES	26	32	15	LOGIC FUNCTIONS
L 700	L1-06	DO YOU USE OR REFER TO TRUTH TABLES FOR AND LOGIC SYMBOLS OR GATES	42	51	27	
L 701	L1-07	DO YOU USE OR REFER TO TRUTH TABLES FOR OR LOGIC SYMBOLS OR GATES	42	51	27	
L 702	L1-08	DO YOU USE OR REFER TO TRUTH TABLES FOR AND OR OR LOGIC SYMBOLS WITH STATE INDICATORS	42	51	27	
L 703	L1-09	DO YOU USE OR REFER TO TRUTH TABLES FOR EXCLUSIVE OR LOGIC SYMBOLS	42	51	27	
L 704	L1-10	DO YOU USE OR REFER TO LOGIC SYMBOLS FOR AND GATES	50	59	35	
L 705	L1-11	DO YOU USE OR REFER TO LOGIC SYMBOLS FOR OR GATES	50	59	35	
L 706	L1-12	DO YOU USE OR REFER TO LOGIC SYMBOLS FOR NAND OR NOR GATES	50	59	35	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	QUESTION	SPC 001	SPC 002	SPC 003	
L 703	L1-13 DO YOU USE OR REFER TO LOGIC SYMBOLS FOR EXCLUSIVE OR GATES	50	58	35	
L 704	L2-01 IN YOUR PRESENT JOB: DO YOU PERFORM ANY TASKS RELATING TO BOOLEAN EQUATIONS, LOGIC DIAGRAMS, OR LOGIC CIRCUITS	38	48	20	
L 705	L2-02 DO YOU DRAW LOGIC SYMBOLS FOR DIRECT COUPLED TRANSISTOR LOGIC (DCTL) CIRCUITS	14	17	10	
L 710	L2-03 DO YOU CONSTRUCT TRUTH TABLES FOR CURRENT MODE LOGIC (CML) CIRCUITS	6	7	5	
L 711	L2-04 DO YOU DRAW LOGIC DIAGRAMS FROM GIVEN BOOLEAN EQUATIONS	13	14	10	
L 712	L2-05 DO YOU MEASURE INPUTS OR OUTPUTS OF LOGIC GATES	38	46	22	
L 713	L2-06 DO YOU DEVELOP OR ANALYZE BOOLEAN EQUATIONS IN THE PROCESS OF TROUBLESHOOTING DIGITAL CIRCUITS	17	21	10	BOOLEAN EQUATIONS
L 714	L2-07 DO YOU ANALYZE LOGIC CIRCUITS BY USING BOOLEAN ALGEBRA	18	20	10	
L 715	L2-08 DO YOU USE OR REFER TO LOGIC SYMBOLS FOR DIRECT COUPLED TRANSISTOR LOGIC (DCTL) CIRCUIT GATES	26	31	17	
L 716	L2-09 DO YOU USE OR REFER TO TRUTH TABLES FOR CURRENT MODE LOGIC (CML) CIRCUITS	10	10	10	
L 717	L2-10 DO YOU USE OR REFER TO LOGIC DIAGRAMS CONSISTING OF MORE THAN ONE GATE	34	42	20	
L 718	L2-11 DO YOU COMPUTE SUM AND CARRY EXPRESSIONS FOR SERIAL HALF OR FULL ADDER LOGIC DIAGRAMS	13	17	5	
L 719	L2-12 DO YOU TRACE DATA FLOW THROUGH PARALLEL FULL ADDER LOGIC DIAGRAMS	22	25	15	
L 720	L2-13 DO YOU WORK WITH ASTABLE (FREE RUNNING) MULTIVIBRATORS	91	96	30	
L 721	L2-14 DO YOU WORK WITH BISTABLE (FLIP-FLOP) MULTIVIBRATORS	92	99	30	
L 722	L2-15 DO YOU WORK WITH MONOSTABLE (ONE-SHOT) MULTIVIBRATORS	91	98	30	
L 723	L2-16 DO YOU USE OR REFER TO FLIP-FLOP MULTIVIBRATOR SYMBOLS	92	99	30	
L 724	L2-17 DO YOU USE OR REFER TO SINGLE-SHOT MULTIVIBRATOR SYMBOLS	91	98	30	
L 725	L2-18 DO YOU USE OR REFER TO FLIP-FLOP CIRCUIT DIAGRAMS	92	99	30	
L 726	L2-19 DO YOU USE OR REFER TO FLIP-FLOP TRUTH TABLES	32	38	20	
L 727	L2-20 DO YOU USE OR REFER TO COMPLEMENTED FLIP-FLOP LOGIC SYMBOLS	35	39	27	
L 728	L2-21 DO YOU USE OR REFER TO COMPLEMENTING FLIP-FLOP LOGIC SYMBOLS	34	38	27	
L 729	L2-22 DO YOU MEASURE OUTPUT WAVESHAPES OF LOGIC CIRCUITS	35	41	25	
L 730	L2-23 DO YOU TRACE DATA FLOW THROUGH COMPLEMENTED FLIP-FLOP SCHEMATIC DIAGRAMS	33	35	30	
L 731	L2-24 DO YOU TRACE DATA FLOW THROUGH COMPLEMENTING FLIP-FLOP SCHEMATIC DIAGRAMS	33	35	30	
L 732	L2-25 DO YOU CONSTRUCT TRUTH TABLES FOR J-K FLIP-FLOP LOGIC SYMBOLS	13	13	13	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	BY-TSK	SPC 001	SPC 002	SPC 003	
L 733	L3-01 DO YOU WORK WITH DIGITAL COUNTERS IN YOUR PRESENT JOB	49	58	32	
L 734	L3-02 DO YOU USE OR REFER TO UP-COUNTERS	42	51	27	
L 735	L3-03 DO YOU USE OR REFER TO DOWN-COUNTERS	32	37	25	
L 736	L3-04 DO YOU USE OR REFER TO SERIAL COUNTERS	33	39	22	
L 737	L3-05 DO YOU USE OR REFER TO PARALLEL COUNTERS	29	32	22	
L 738	L3-06 DO YOU USE OR REFER TO RING COUNTERS	15	13	20	
L 739	L3-07 DO YOU USE OR REFER TO DECADE COUNTERS	28	30	25	
L 740	L3-08 DO YOU USE OR REFER TO COUNT DETECT CIRCUITS	29	31	25	
L 741	L3-09 DO YOU USE OR REFER TO DOWN CLOCKS	24	25	22	
L 742	L3-10 DO YOU USE OR REFER TO UP CLOCKS	26	28	22	
L 743	L3-11 DO YOU TRACE DATA FLOW THROUGH LOGIC DIAGRAMS OF UP-COUNTERS HAVING COMPLEMENTED FLIP-FLOPS	38	44	22	
L 744	L3-12 DO YOU TRACE DATA FLOW THROUGH LOGIC DIAGRAMS OF SERIAL UP- OR DOWN-COUNTERS HAVING COMPLEMENTING FLIP-FLOPS	30	35	20	
L 745	L3-13 DO YOU TRACE DATA FLOW THROUGH LOGIC DIAGRAMS OF DECADE COUNTERS	25	27	22	COUNTERS
L 746	L3-14 DO YOU TRACE DATA FLOW THROUGH LOGIC DIAGRAMS OF RING COUNTERS	13	10	17	
L 747	L3-15 DO YOU TRACE DATA FLOW THROUGH LOGIC DIAGRAMS OF SERIAL UP-COUNTERS FEEDING A PARALLEL STORAGE REGISTER	23	24	20	
L 748	L3-16 DO YOU TRACE DATA FLOW THROUGH LOGIC DIAGRAMS OF SHIFT REGISTERS	20	20	20	
L 749	L3-17 DO YOU TRACE DATA FLOW THROUGH LOGIC DIAGRAMS OF OTHER TYPE OF COUNTERS	30	32	25	
L 750	L3-18 DO YOU COMPUTE THE BINARY COUNT AFTER SPECIFIC INPUT PULSES FOR UP-COUNTERS HAVING COMPLEMENTED FLIP-FLOPS	25	32	13	
L 751	L3-19 DO YOU COMPUTE THE BINARY COUNT AFTER SPECIFIC INPUT PULSES FOR SERIAL UP- OR DOWN-COUNTERS HAVING COMPLEMENTING FLIP-FLOPS	20	23	15	
L 752	L3-20 DO YOU COMPUTE THE BINARY COUNT AFTER SPECIFIC INPUT PULSES FOR SERIAL UP-COUNTERS FEEDING A PARALLEL STORAGE REGISTERS	18	20	15	
L 753	L3-21 DO YOU COMPUTE THE BINARY COUNT AFTER SPECIFIC INPUT PULSES FOR OTHER TYPES OF COUNTERS	22	27	13	
L 754	L3-22 DO YOU CONSTRUCT TRUTH TABLES FROM LOGIC DIAGRAMS OF DECADE COUNTERS	6	10	0	
L 755	L3-23 DO YOU DETERMINE THE STATE OF EACH FLIP-FLOP IN RING COUNTERS FOR SPECIFIC INPUT PULSES	14	14	13	
L 756	L3-24 DO YOU DETERMINE THE APPROPRIATE AND GATE NECESSARY IN COUNT DETECT CIRCUITS TO INDICATE A REQUIRED COUNT	24	25	22	
L 757	L1-01 DO YOU WORK WITH SAWTOOTH WAVE GENERATORS	77	83	65	
L 758	L1-02 DO YOU WORK WITH TRAPEZOIDAL WAVE GENERATORS	60	70	42	
L 759	L1-03 DO YOU WORK WITH PULSED OSCILLATORS WITH REGENERATIVE FEEDBACK	60	69	45	TIMING CIRCUITS
L 760	L1-04 DO YOU WORK WITH PULSED OSCILLATORS WITHOUT REGENERATIVE FEEDBACK	52	59	40	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DUTIES	SPC 001	SPC 002	SPC 003	
M 761	M1-05 DO YOU WORK WITH BLOCKING OSCILLATORS	70	79	55	
M 762	M1-06 DO YOU USE OR REFER TO RISE TIME	71	80	55	
M 763	M1-07 DO YOU USE OR REFER TO FALL OR FLYBACK TIME	66	75	50	
M 764	M1-08 DO YOU USE OR REFER TO SWEEP TIME	76	85	60	
M 765	M1-09 DO YOU USE OR REFER TO ELECTRICAL LENGTH OF SAWTOOTH WAVEFORMS	72	80	57	
M 766	M1-10 DO YOU USE OR REFER TO PHYSICAL LENGTH OF SAWTOOTH WAVEFORMS	72	82	55	
M 767	M1-11 DO YOU USE OR REFER TO LINEAR SLOPE OF SAWTOOTH WAVEFORMS	69	79	52	
M 768	M1-12 DO YOU USE OR REFER TO GATE LENGTH OF SAWTOOTH WAVEFORMS	62	70	47	
M 769	M2-01 DO YOU USE SIGNAL GENERATORS IN YOUR PRESENT JOB	68	77	50	
M 770	M2-02 DO YOU PERFORM OPERATIONAL CHECKS WHILE USING SIGNAL GENERATORS	62	69	50	
M 771	M2-03 DO YOU PERFORM PERIODIC MAINTENANCE SUCH AS ADJUSTING, ALIGNING, OR CALIBRATING WHILE USING SIGNAL GENERATORS	61	70	45	
M 772	M2-04 DO YOU TROUBLESHOOT TO AN ASSEMBLY OR SUBASSEMBLY WHILE USING SIGNAL GENERATORS	58	68	40	USE OF SIGNAL GENERATORS
M 773	M2-05 DO YOU TROUBLESHOOT TO THE SMALLEST REPLACEABLE COMPONENT WHILE USING SIGNAL GENERATORS	49	56	35	
M 774	M2-06 DO YOU USE AUDIO SINE-WAVE GENERATORS	43	48	35	
M 775	M2-07 DO YOU USE AUDIO NON-SINUSOIDAL WAVE GENERATORS SUCH AS SQUARE WAVE, TRIANGLE, PULSE, OR SPIKE	36	41	27	
M 776	M2-08 DO YOU USE RF GENERATORS LESS THAN 1,000 MH	42	51	27	
M 777	M2-09 DO YOU USE RF GENERATORS GREATER THAN 1,000 MH	51	55	45	
M 778	M2-10 DO YOU USE OTHER SPECIAL PURPOSE OR MULTI-FUNCTION GENERATORS	35	39	27	
M 779	M3-01 IN YOUR PRESENT JOB, DO YOU PERFORM ANY TASKS DEALING WITH ALTERNATING CURRENT OR DIRECT CURRENT MOTORS OR GENERATORS	91	92	90	
M 780	M3-02 DO YOU INSPECT MOTORS	90	92	88	
M 781	M3-03 DO YOU CLEAN OR LUBRICATE MOTORS	90	90	90	
M 782	M3-04 DO YOU OPERATE MOTORS	85	87	80	
M 783	M3-05 DO YOU REMOVE OR REPLACE COMPLETE MOTORS	90	92	88	
M 784	M3-06 DO YOU REMOVE OR REPLACE MOTOR PARTS	68	69	65	
M 785	M3-07 DO YOU TROUBLESHOOT AS FAR AS CHECKING WIRE CONNECTIONS OF MOTORS	89	92	85	MOTORS AND GENERATORS
M 786	M3-08 DO YOU TROUBLESHOOT DOWN TO COMPONENT PARTS OF MOTORS	50	54	45	
M 787	M3-09 DO YOU PERFORM ANY TASKS ON FIELD COILS	34	39	25	
M 788	M3-10 DO YOU PERFORM ANY TASKS ON ARMATURES	39	41	35	
M 789	M3-11 DO YOU PERFORM ANY TASKS ON ROTORS	43	48	35	
M 790	M3-12 DO YOU PERFORM ANY TASKS ON BRUSHES	76	77	72	
M 791	M3-13 DO YOU PERFORM ANY TASKS ON SLIP RINGS	67	72	57	
M 792	M3-14 DO YOU PERFORM ANY TASKS ON COMMUTATORS	54	59	45	
M 793	M3-15 DO YOU PERFORM ANY TASKS ON POLE PIECES	32	35	27	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

			SPC 001	SPC 002	SPC 003	
M 794	MJ-18	DO YOU DETERMINE OR MEASURE THE MAGNITUDE OF THE FORCE OR TORQUE CREATED BY A MOTOR	11	11	10	
M 795	MJ-17	DO YOU DETERMINE OR MEASURE THE DIRECTION OF THE MECHANICAL FORCE OR TORQUE CREATED BY A MOTOR	18	20	15	
M 796	MJ-18	DO YOU DETERMINE OR MEASURE THE MAGNITUDE OR DIRECTION OF THE INDUCED VOLTAGE IN MOTORS	16	17	15	
M 797	MJ-19	DO YOU WORK WITH SYNCHRONOUS MOTORS	81	85	75	
M 798	MJ-20	DO YOU WORK WITH INDUCTION MOTORS	61	61	63	
M 799	MJ-21	DO YOU WORK WITH SPLIT-PHASE MOTORS	41	42	38	
M 800	MJ-22	DO YOU WORK WITH SOME COMBINATION OF THE ABOVE MOTORS	59	62	55	
M 801	MJ-23	DO YOU INSPECT GENERATORS	48	45	52	
M 802	MJ-24	DO YOU CLEAN OR LUBRICATE GENERATORS	48	46	50	
M 803	MJ-25	DO YOU OPERATE GENERATORS	50	55	40	
M 804	MJ-26	DO YOU REMOVE OR REPLACE COMPLETE GENERATORS	41	42	38	
M 805	MJ-27	DO YOU REMOVE OR REPLACE GENERATOR PARTS	34	37	30	
M 806	MJ-28	DO YOU TROUBLESHOOT AS FAR AS CHECKING WIRE CONNECTIONS OF GENERATORS	46	46	45	
M 807	MJ-29	DO YOU TROUBLESHOOT DOWN TO COMPONENT PARTS OF GENERATORS	31	32	27	
M 808	MI-01	DO YOU WORK WITH METERS IN YOUR PRESENT JOB	89	89	90	
M 809	MI-02	DO YOU CONCEPTUALIZE OR CONSIDER THE FUNCTIONS OF PERMANENT MAGNETS	32	38	22	
M 810	MI-03	DO YOU CONCEPTUALIZE OR CONSIDER THE FUNCTIONS OF MOVING COILS	36	42	25	
M 811	MI-04	DO YOU CONCEPTUALIZE OR CONSIDER THE FUNCTIONS OF SPIRAL SPRINGS	36	42	25	METER MOVEMENTS
M 812	MI-05	DO YOU READ METER SCALES	92	92	92	
M 813	MI-06	DO YOU EXTEND THE RANGE OF AMMETERS	49	56	35	
M 814	MI-07	DO YOU ZERO OHMMETERS	93	92	95	
M 815	MI-08	DO YOU ZERO AMMETERS	51	55	45	
M 816	MI-09	DO YOU EXTEND THE RANGE OF VOLTMETERS	72	70	75	
M 817	MI-10	DO YOU USE OR REFER TO VOLTMETER SENSITIVITY (EXPRESSED IN UNITS OF OHMS PER VOLT)	68	76	52	
M 818	MZ-01	DO YOU WORK WITH SATURABLE REACTORS OR MAGNETIC AMPLIFIERS IN YOUR PRESENT JOB	43	56	20	
M 819	MZ-02	DO YOU INSPECT MAGNETIC AMPLIFIERS OR SATURABLE REACTORS	41	51	22	
M 820	MZ-03	DO YOU CLEAN MAGNETIC AMPLIFIERS OR SATURABLE REACTORS	38	48	20	
M 821	MZ-04	DO YOU ADJUST MAGNETIC AMPLIFIERS OR SATURABLE REACTORS	38	49	17	SATURABLE REACTORS AND MAGNETIC AMPLIFIERS
M 822	MZ-05	DO YOU TROUBLESHOOT MAGNETIC AMPLIFIERS OR SATURABLE REACTORS	41	51	22	
M 823	MZ-06	DO YOU REMOVE OR REPLACE MAGNETIC AMPLIFIERS OR SATURABLE REACTORS	41	54	20	
M 824	MZ-07	DO YOU REMOVE OR REPLACE MAGNETIC AMPLIFIER OR SATURABLE REACTOR COMPONENTS	32	39	20	

BASE GROUP SUMMARY
PERCENT MEMBERS RESPONDING

	QY-TSK	SPC 001	SPC 002	SPC 003	
N 025	N2-08 DO YOU USE OR REFER TO HYSTERESIS CURVES OR LOOPS	11	15	2	
N 02A	N2-09 DO YOU INTERPRET SCHEMATIC DRAWINGS TO DEVELOP OUTPUT WAVEFORMS ACROSS REACTOR WINDINGS OR LOAD RESISTORS OF SINGLE WINDING SATURABLE REACTORS	22	28	10	
N 027	N2-10 DO YOU MEASURE OUTPUT WAVEFORMS ACROSS REACTOR WINDINGS OR LOAD RESISTORS OF SINGLE WINDING SATURABLE REACTORS	27	35	13	
N 02A	N2-11 DO YOU INTERPRET SCHEMATIC DRAWINGS TO DEVELOP OUTPUT WAVEFORMS FOR MAGNETIC AMPLIFIERS	25	34	10	
N 029	N2-12 DO YOU USE OR REFER TO COERCIVE FORCE IN SATURABLE REACTORS	6	10	0	
N 03[illegible]	N2-13 DO YOU USE OR REFER TO RESIDUAL MAGNETISM IN SATURABLE REACTORS	11	17	0	
N 03[illegible]	N2-14 DO YOU USE OR REFER TO FLUX DENSITY IN SATURABLE REACTORS	12	18	0	
N 03[illegible]	N2-15 DO YOU USE OR REFER TO POINT OF SATURATION IN SATURABLE REACTORS	19	21	2	
N 033	N2-16 DO YOU USE OR REFER TO SATURABLE REACTOR SCHEMATIC SYMBOLS	30	39	13	
N 034	N3-01 DO YOU WORK WITH WAVESHAPING CIRCUITS IN YOUR PRESENT JOB	72	81	52	
N 035	N3-02 DO YOU USE OR REFER TO TRANSIENT INTERVALS	92	94	35	
N 03A	N3-03 DO YOU USE OR REFER TO PULSE WIDTH (PW)	72	85	50	
N 037	N3-04 DO YOU USE OR REFER TO PULSE RECURRENCE TIME (PRT)	46	73	52	
N 038	N3-05 DO YOU USE OR REFER TO PULSE RECURRENCE FREQUENCY (PRF)	69	79	52	
N 039	N3-06 DO YOU USE OR REFER TO DIFFERENTIATING CIRCUITS	55	42	42	WAVESHAPING CIRCUITS
N 03[illegible]	N3-07 DO YOU USE OR REFER TO INTEGRATING CIRCUITS	59	60	42	
N 03[illegible]	N3-08 DO YOU USE OR REFER TO THE CLASSIFICATION OF TIME CONSTANTS (TC) AS LONG, MEDIUM, OR SHORT	53	63	35	
N 03[illegible]	N3-09 DO YOU DETERMINE WHETHER AN LR OR RC CIRCUIT IS DIFFERENTIATING OR INTEGRATING BASED ON THE TIME CONSTANT AND OUTPUT CONFIGURATION	20	23	15	
N 041	N3-10 DO YOU WORK WITH SQUARE WAVE GENERATORS	55	63	40	
N 04[illegible]	N3-11 DO YOU WORK WITH RECTANGULAR WAVE GENERATORS	40	44	32	
O 045	O1-01 DO YOU WORK ON SINGLE SIDEBAND SYSTEMS IN YOUR PRESENT JOB	5	4	5	
O 046	O1-02 DO YOU INSPECT SSB TRANSMIT OR RECEIVE SYSTEMS	3	1	5	
O 047	O1-03 DO YOU CLEAN SSB TRANSMIT OR RECEIVE SYSTEMS	3	1	5	
O 048	O1-04 DO YOU ALIGN SSB TRANSMIT OR RECEIVE SYSTEMS	2	1	2	
O 049	O1-05 DO YOU TROUBLESHOOT TO SSB TRANSMIT OR RECEIVE SYSTEMS	3	1	5	SINGLE SIDEBAND SYSTEMS
O 04[illegible]	O1-06 DO YOU TROUBLESHOOT TO SSB TRANSMIT OR RECEIVE COMPONENTS	2	1	2	
O 04[illegible]	O1-07 DO YOU REMOVE OR REPLACE SSB TRANSMIT OR RECEIVE SYSTEMS	3	1	5	
O 04[illegible]	O1-08 DO YOU REMOVE OR REPLACE SSB TRANSMIT OR RECEIVE COMPONENTS	2	1	2	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		QY-YSR	SPC 001	SPC 002	SPC 003	
C	851	01-09 DO YOU PERFORM TASKS ON SSB AUDIO AMPLIFIERS	2	1	2	
C	854	01-10 DO YOU PERFORM TASKS ON SSB BALANCED MODULATORS	3	1	5	
C	855	01-11 DO YOU PERFORM TASKS ON SSB CARRIER OSCILLATORS	3	1	5	
C	856	01-12 DO YOU PERFORM TASKS ON SSB LC FILTERS	3	1	5	
C	857	01-13 DO YOU PERFORM TASKS ON SSB CRYSTAL FILTERS	3	1	5	
C	858	01-14 DO YOU PERFORM TASKS ON SSB MECHANICAL FILTERS	3	1	5	
C	859	01-15 DO YOU PERFORM TASKS ON SSB OSCILLATORS	3	1	5	
C	860	01-16 DO YOU PERFORM TASKS ON SSB MIXERS	3	1	5	
C	861	01-17 DO YOU PERFORM TASKS ON SSB DRIVERS	3	1	5	
C	862	01-18 DO YOU PERFORM TASKS ON SSB POWER AMPLIFIERS	3	1	5	
C	863	01-19 DO YOU PERFORM TASKS ON SSB RF AMPLIFIERS	3	1	5	
C	864	01-20 DO YOU PERFORM TASKS ON SSB FREQUENCY CONVERTERS	3	1	5	
C	865	01-21 DO YOU PERFORM TASKS ON SSB IF AMPLIFIERS	3	1	5	
C	866	01-22 DO YOU PERFORM TASKS ON SSB DEMODULATORS	3	1	5	
C	867	01-23 DO YOU PERFORM TASKS ON SSB DON'T REMEMBER WHICH SSB SYSTEM STAGES	1	1	0	
C	868	01-24 DO YOU USE OR REFER TO SELECTIVE FADING	1	1	0	
C	869	01-25 DO YOU USE OR REFER TO PEAK POWER	3	1	5	
C	870	01-26 DO YOU USE OR REFER TO FREQUENCY STABILITY	3	1	5	
C	871	01-27 DO YOU USE OR REFER TO RESPONSE CURVES FOR BANDWIDTH FILTERS	2	1	2	
C	872	01-28 DO YOU CALCULATE PEAK POWER OR EFFECTIVE POWER OF SSB TRANSMITTERS	1	1	0	
C	873	01-29 DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH SSB TRANSMITTER SCHEMATIC DIAGRAMS	3	1	5	
C	874	01-30 DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH SSB RECEIVER SCHEMATIC DIAGRAMS	3	1	5	
C	875	02-01 DO YOU WORK ON PULSE MODULATION SYSTEMS IN YOUR PRESENT JOB	48	52	40	
C	876	02-02 DO YOU INSPECT PULSE MODULATION SYSTEMS	50	54	42	
C	877	02-03 DO YOU CLEAN PULSE MODULATION SYSTEMS	49	54	40	
C	878	02-04 DO YOU ALIGN PULSE MODULATION SYSTEMS	47	52	38	
C	879	02-05 DO YOU TROUBLESHOOT TO PULSE MODULATION SYSTEMS	49	54	40	
C	880	02-06 DO YOU TROUBLESHOOT TO PULSE MODULATION SYSTEM COMPONENTS	47	52	38	PULSE MODULATION SYSTEMS
C	881	02-07 DO YOU REMOVE OR REPLACE PULSE MODULATION SYSTEMS	41	45	35	
C	882	02-08 DO YOU REMOVE OR REPLACE PULSE MODULATION SYSTEM COMPONENTS	48	54	38	
C	883	02-09 DO YOU WORK ON PULSE-AMPLITUDE MODULATION (PAM) SYSTEMS	25	28	20	
C	884	02-10 DO YOU WORK ON PULSE-DURATION MODULATION (PDM) SYSTEMS	26	30	20	
C	885	02-11 DO YOU WORK ON PULSE-POSITION MODULATION (PPM) SYSTEMS	11	8	15	
C	886	02-12 DO YOU WORK ON PULSE-CODE MODULATION (PCM) SYSTEMS	4	3	5	
C	887	02-13 DO YOU WORK ON LINE PULSING MODULATION SYSTEMS	8	10	5	
C	888	02-14 DO YOU WORK ON DON'T REMEMBER WHICH TYPE OF MODULATION SYSTEM	16	15	17	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		DUTIES	SPC 001	SPC 002	SPC 003	
0	889	02-15 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM POWER SUPPLIES	44	48	38	
0	890	02-16 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM CHARGING CHOKES AND CHARGING DIODES	37	44	25	
0	891	02-17 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM PULSE FORMING NETWORKS	44	48	38	
0	892	02-18 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM TIMERS	34	42	20	
0	893	02-19 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM SWITCHES SUCH AS GAS THYRATRONS	41	46	32	
0	894	02-20 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM PULSE TRANSFORMERS	43	48	35	
0	895	02-21 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM TRANSMITTER TUBES	43	48	35	
0	896	02-22 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM RF AMPLIFIERS	44	49	35	
0	897	02-23 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM FREQUENCY CONVERTERS	34	38	27	
0	898	02-24 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM IF AMPLIFIERS	44	49	35	
0	899	02-25 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM DETECTORS	44	48	38	
0	900	02-26 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM VIDEO AMPLIFIERS	45	49	38	
0	901	02-27 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM POWER VIDEO AMPLIFIERS	29	31	25	
0	902	02-28 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM DON'T REMEMBER WHICH PULSE MODULATION SYSTEM STAGES	5	3	10	
0	903	02-29 DO YOU USE OR REFER TO PULSE RECURRENCE FREQUENCY (PRF)	46	51	38	
0	904	02-30 DO YOU USE OR REFER TO PULSE RECURRENCE TIME (PRT)	41	45	35	
0	905	02-31 DO YOU USE OR REFER TO PULSE WIDTH (PW)	45	51	35	
0	906	02-32 DO YOU USE OR REFER TO PULSE SHAPE	43	49	32	
0	907	02-33 DO YOU USE OR REFER TO PEAK POWER	41	46	32	
0	908	02-34 DO YOU USE OR REFER TO AVERAGE POWER	44	51	32	
0	909	02-35 DO YOU CALCULATE PULSE RECURRENCE TIME (PRT) OR PULSE RECURRENCE FREQUENCY (PRF)	25	31	15	
0	910	02-36 DO YOU MEASURE PULSE RECURRENCE TIME (PRT) OR PULSE RECURRENCE FREQUENCY (PRF)	36	42	30	
0	911	02-37 DO YOU USE FORMULAS TO CALCULATE AVERAGE POWER OR PEAK POWER OF PULSE MODULATION TRANSMIT SYSTEMS	21	25	13	
0	912	02-38 DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH PULSE MODULATION TRANSMITTER SCHEMATIC DIAGRAMS	41	46	32	
0	913	02-39 DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH PULSE MODULATION RECEIVER SCHEMATIC DIAGRAMS	44	52	30	
0	914	03-01 DO YOU WORK WITH ANTENNAS IN YOUR PRESENT JOB	70	79	55	ANTENNAS
0	915	03-02 DO YOU INSPECT ANTENNAS	68	76	55	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	QY-TSK	SPC 001	SPC 002	SPC 003
D 916	03-03 DO YOU CLEAN ANTENNAS	69	77	55
D 917	03-04 DO YOU PHYSICALLY ALIGN ANTENNAS	68	77	50
D 918	03-05 DO YOU ELECTRICALLY ALIGN ANTENNAS	57	62	47
D 919	03-06 DO YOU TROUBLESHOOT TO ANTENNAS	69	70	52
D 920	03-07 DO YOU TROUBLESHOOT TO ANTENNA COMPONENTS	62	70	47
D 921	03-08 DO YOU REMOVE OR INSTALL ANTENNAS	96	51	38
D 922	03-09 DO YOU REMOVE OR REPLACE COMPONENTS OF ANTENNAS	59	66	47
D 923	03-10 DO YOU USE OR REFER TO TECHNICAL DATA CONTAINING REPRESENTATIONS OF E OR ELECTRIC FIELD LINES	17	21	10
D 924	03-11 DO YOU USE OR REFER TO TECHNICAL DATA CONTAINING REPRESENTATIONS OF H OR MAGNETIC FIELD LINES	17	21	10
D 925	03-12 DO YOU DETERMINE THE DIRECTION OF THE MAGNETIC LINES IN RELATION TO THE ELECTRIC LINES OF FORCE FOR ANTENNAS	15	20	7
D 926	03-13 DO YOU USE OR REFER TO THE GENERAL RULE THAT ANTENNAS WHICH ARE OF CORRECT LENGTH (HALF-WAVE) ACT AS INDUCTIVE LOADS TO THE GENERATOR	14	17	7
D 927	03-14 DO YOU USE OR REFER TO THE GENERAL RULE THAT ANTENNAS WHICH ARE LONGER THAN A HALF-WAVE ACT AS INDUCTIVE LOADS TO THE GENERATOR	12	15	5
D 928	03-15 DO YOU USE OR REFER TO THE GENERAL RULE THAT ANTENNAS WHICH ARE SHORTER THAN A HALF-WAVE ACT AS CAPACITIVE LOADS TO THE GENERATOR	14	17	7
D 929	03-16 DO YOU WORK WITH HERTZ ANTENNAS	14	17	7
D 930	03-17 DO YOU WORK WITH MARCONI ANTENNAS	8	10	5
D 931	03-18 DO YOU WORK WITH BROADSIDE ARRAYS	6	8	7
D 932	03-19 DO YOU WORK WITH END-FIRE ARRAYS	3	9	0
D 933	03-20 DO YOU WORK WITH CARDIOID ARRAYS	4	3	5
D 934	03-21 DO YOU WORK WITH COLLINEAR ARRAYS	8	8	7
D 935	03-22 DO YOU USE OR REFER TO THE TERM ELECTROMAGNETIC INDUCTION FIELDS WHEN WORKING WITH ANTENNAS	13	17	5
D 936	03-23 DO YOU MEASURE ELECTROMAGNETIC INDUCTION FIELDS OF ANTENNAS	8	11	2
D 937	03-24 DO YOU USE OR REFER TO THE TERM ELECTROMAGNETIC RADIATION FIELDS WHEN WORKING WITH ANTENNAS	17	23	7
D 938	03-25 DO YOU MEASURE ELECTROMAGNETIC RADIATION FIELDS OF ANTENNAS	8	11	2
D 939	03-26 DO YOU USE OR REFER TO THE TIME PHASE OF ELECTRIC (E) AND MAGNETIC (H) COMPONENTS IN ANTENNA RADIATION	12	15	5
D 940	03-27 DO YOU USE OR REFER TO THE TIME PHASE OF ELECTRIC (E) AND MAGNETIC (H) COMPONENTS IN ANTENNA INDUCTION FIELD	11	14	5
D 941	03-28 ARE ANY OF THE ANTENNAS YOU WORK ON LINEARLY POLARIZED	19	21	15
D 942	03-29 ARE ANY OF THE ANTENNAS YOU WORK ON CIRCULARLY POLARIZED	17	17	17
D 943	03-30 DO YOU MEASURE OR DETERMINE THE POLARITY OF ANTENNAS YOU WORK ON	6	10	0
D 944	03-31 DO YOU CONSTRUCT, OR MAKE THE CALCULATIONS NECESSARY TO CONSTRUCT, ANTENNAS OF CORRECT LENGTH FOR SPECIFIC WAVELENGTHS	5	4	5

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		QUESTION	SPC 001	SPC 002	SPC 003	
C	Y45	Q3-32 DO THE ANTENNA ARRAYS YOU WORK WITH CONTAIN PARASITIC ELEMENTS	13	18	2	
C	Y46	Q3-33 DO THE ANTENNA ARRAYS YOU WORK WITH CONTAIN PARASITIC ELEMENTS SERVING AS DIRECTORS	9	13	2	
C	Y47	Q3-34 DO THE ANTENNA ARRAYS YOU WORK WITH CONTAIN PARASITIC ELEMENTS SERVING AS REFLECTORS	22	28	10	
C	Y48	Q3-35 DO THE ANTENNA ARRAYS YOU WORK WITH CONTAIN DON'T REMEMBER WHAT KIND OF ELEMENTS	19	25	7	
C	Y49	Q3-36 DO YOU WORK ON UNIDIRECTIONAL ANTENNAS	43	51	30	
		Q3-37 DO YOU WORK ON BIDIRECTIONAL ANTENNAS	20	18	22	
		Q3-38 DO YOU WORK ON DON'T REMEMBER THE DIRECTIONALITY	9	11	5	
		Q3-39 DO YOU WORK WITH ROTAR ANTENNA ARRAYS	35	39	27	
	Y53	P1-01 IN YOUR PRESENT JOB DO YOU WORK WITH TRANSMISSION LINES (TRANSMISSION LINES ARE DEFINED TO INCLUDE LEADS BETWEEN RECEIVERS AND ANTENNAS, TELEPHONE LEADS, AS WELL AS HIGH VOLTAGE POWER LINES, ETC. DO NOT CONSIDER WAVEGUIDES AS TRANSMISSION LINES	41	48	27	
P	Y54	P1-02 DO YOU REFER TO OR USE COPPER LOSS OR I2R LOSS IN TRANSMISSION LINES	14	15	10	
P	Y55	P1-03 DO YOU REFER TO OR USE SKIN EFFECTS OF HIGH FREQUENCY CURRENTS IN TRANSMISSION LINES	14	17	10	
P	Y56	P1-04 DO YOU REFER TO OR USE RADIATION LOSS IN TRANSMISSION LINES	14	15	10	
P	Y57	P1-05 DO YOU USE OR REFER TO DIELECTRIC LOSS IN TRANSMISSION LINES	14	15	10	
P	Y58	P1-06 DO YOU USE OR REFER TO LEAKAGE LOSSES IN TRANSMISSION LINES	19	23	13	TRANSMISSION LINES
P	Y59	P1-07 DO YOU WORK WITH TWISTED PAIR TRANSMISSION LINES	21	25	13	
P	Y60	P1-08 DO YOU WORK WITH TWIN LEAD TRANSMISSION LINES	18	23	10	
P	Y61	P1-09 DO YOU WORK WITH OPEN TWO-WIRE TRANSMISSION LINES	7	8	5	
P	Y62	P1-10 DO YOU WORK WITH FLEXIBLE COAXIAL CABLE TRANSMISSION LINES	37	46	20	
P	Y63	P1-11 DO YOU WORK WITH RIGID COAXIAL CABLE TRANSMISSION LINES	21	29	15	
P	Y64	P1-12 DO YOU TROUBLESHOOT TRANSMISSION LINES	32	38	20	
P	Y65	P1-13 DO YOU ANALYZE VOLTAGE OR CURRENT WAVEFORMS IN TRANSMISSION LINES TO DETERMINE THE TYPE OF TERMINATION (OPEN, SHORTED, CAPACITIVE, INDUCTIVE)	4	3	5	
P	Y66	P1-14 DO YOU SELECT APPROPRIATE TRANSMISSION LINES TERMINATIONS TO ACHIEVE DESIRED WAVEFORMS	0	4	10	
P	Y67	P1-15 DO YOU USE OR REFER TO SCHEMATIC SYMBOLS FOR LINE TERMINATIONS IN TERMS OF CIRCUIT TERMINATIONS	22	27	13	
P	Y68	P1-16 DO YOU MEASURE STANDING WAVE RATIOS (SR) OF TRANSMISSION LINES	25	28	20	
P	Y69	P1-17 DO YOU CALCULATE STANDING WAVE RATIOS (SWR) OF TRANSMISSION LINES	5	3	10	
P	Y7	P1-18 DO YOU PERFORM THE CALCULATIONS NECESSARY TO DETERMINE THE IMPEDANCE AND LENGTH OF QUARTER - WAVELENGTH MATCHING TRANSFORMERS TO MATCH TRANSMISSION LINES TO LOADS	1	1	0	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DUTY-TASK	SPC 001	SPC 002	SPC 003	
P 971	P1-19 DO YOU WORK WITH TRANSMISSION LINES WHICH ARE MATCHED TO LOADS USING MATCHING TRANSFORMERS	23	28	15	
P 972	P1-20 DO YOU WORK WITH TRANSMISSION LINES WHICH ARE MATCHED TO LOADS USING DELTA MATCHING	5	4	5	
P 973	P1-21 DO YOU SELECT THE TYPE OF TRANSMISSION LINE NEEDED FOR PARTICULAR JOBS WITHOUT REFERRING TO TECHNICAL DATA	1	1	0	
P 974	P1-22 DO YOU USE OR REFER TO THE TERM CHARACTERISTIC IMPEDANCE (Z0) OF TRANSMISSION LINES	16	17	15	
P 975	P1-23 DO YOU CALCULATE THE CHARACTERISTIC IMPEDANCE (Z0) OF TRANSMISSION LINES	4	4	2	
P 976	P1-24 DO YOU USE OR REFER TO THE TERM CUTOFF FREQUENCY OF TRANSMISSION LINES	8	7	10	
P 977	P1-25 DO YOU USE OR REFER TO THE TERM VELOCITY FACTOR (K) OF TRANSMISSION LINES	4	6	0	
P 978	P1-26 DO YOU COMPUTE THE ELECTRICAL LENGTH OF TRANSMISSION LINES FOR PARTICULAR FREQUENCIES	2	1	2	
P 979	P1-27 DO YOU CONSTRUCT TRANSMISSION LINES OF PARTICULAR ELECTRICAL LENGTH FOR GIVEN FREQUENCIES	2	1	2	
P 980	P1-28 DO YOU USE OR REFER TO THE GENERAL RULE THAT AS THE FREQUENCY INCREASES AND THE PHYSICAL LENGTH OF TRANSMISSION LINES REMAIN CONSTANT, THE ELECTRICAL LENGTH INCREASES	7	6	10	
P 981	P1-29 DO YOU WORK WITH NONRESONANT (FLAT) TRANSMISSION LINES	8	13	0	
P 982	P1-30 DO YOU WORK WITH RESONANT TRANSMISSION LINES	14	15	10	
P 983	P1-31 DO YOU WORK WITH TRANSMISSION LINES WHICH ARE MATCHED TO LOADS USING STUB MATCHING	5	3	7	
P 984	P2-01 DO YOU WORK WITH WAVEGUIDES OR CAVITY RESONATORS IN YOUR PRESENT JOB	61	76	35	
P 985	P2-02 DO YOU INSPECT WAVEGUIDES OR CAVITY RESONATORS	59	75	32	
P 986	P2-03 DO YOU CLEAN WAVEGUIDES OR CAVITY RESONATORS	49	59	30	
P 987	P2-04 DO YOU BEND WAVEGUIDES OR CAVITY RESONATORS	3	3	2	
P 988	P2-05 DO YOU TWIST WAVEGUIDES OR CAVITY RESONATORS	4	3	5	
P 989	P2-06 DO YOU PRESSURIZE WAVEGUIDES OR CAVITY RESONATORS	59	78	30	WAVEGUIDES AND CAVITY RESONATORS
P 990	P2-07 DO YOU PURGE WAVEGUIDES OR CAVITY RESONATORS	36	44	22	
P 991	P2-08 DO YOU TROUBLESHOOT WAVEGUIDES OR CAVITY RESONATORS	44	55	25	
P 992	P2-09 DO YOU REMOVE OR INSTALL COMPLETE WAVEGUIDES	28	32	20	
P 993	P2-10 DO YOU REMOVE OR INSTALL WAVEGUIDE SECTIONS	59	73	32	
P 994	P2-11 DO YOU REMOVE OR INSTALL DUMMY LOADS	49	59	30	
P 995	P2-12 DO YOU REMOVE OR INSTALL E BENDS	16	20	10	
P 996	P2-13 DO YOU REMOVE OR INSTALL H BENDS	17	20	13	
P 997	P2-14 DO YOU REMOVE OR INSTALL OTHER BENDS	28	30	25	
P 998	P2-15 DO YOU REMOVE OR INSTALL CHOKE JOINTS	14	17	7	
P 999	P2-16 DO YOU REMOVE OR INSTALL ROTATING JOINTS	56	71	27	
P1000	P2-17 DO YOU REMOVE OR INSTALL DIRECTIONAL COUPLERS	43	54	25	
P1001	P2-18 DO YOU REMOVE OR INSTALL BIDIRECTIONAL COUPLERS	16	20	10	
P1002	P2-19 DO YOU USE OR REFER TO ANY ONE OF WAVEGUIDES	12	15	5	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	QUESTION	SPC 001	SPC 002	SPC 003
P1003	P2-20 DO YOU USE OR REFER TO THE WALL OF WAVEGUIDES	12	15	5
P1004	P2-21 DO YOU USE OR REFER TO CUTOFF FREQUENCY OF WAVEGUIDES	15	18	10
P1005	P2-22 DO YOU USE OR REFER TO FREQUENCY-DETERMINING WALL OF WAVEGUIDES	7	10	2
P1006	P2-23 DO YOU USE OR REFER TO POWER-DETERMINING WALL OF WAVEGUIDES	10	13	5
P1007	P2-24 DO YOU USE OR REFER TO ELECTRIC FIELD BOUNDARY CONDITIONS	6	8	2
P1008	P2-25 DO YOU USE OR REFER TO MAGNETIC FIELD BOUNDARY CONDITIONS	6	8	2
P1009	P2-26 DO YOU USE OR REFER TO DUPLEXER FIELD BOUNDARY CONDITIONS	13	17	5
P1010	P2-27 DO YOU USE OR REFER TO THE GENERAL RULE THAT MOST WAVEGUIDES ARE MADE WITH A "B" WALL SIZE OF .7 WAVELENGTHS OF THE OPERATING FREQUENCY	8	11	2
P1011	P2-28 DO YOU USE OR REFER TO THE GENERAL RULE THAT MOST "A" WALLS RANGE FROM .2 TO .5 WAVELENGTHS IN SIZE, WITH .35 USED AS AN AVERAGE	6	11	2
P1012	P2-29 ARE YOU CONCERNED WITH THE MATERIAL (SUCH AS BRASS) WHICH WAVEGUIDES ARE MADE OF	9	10	7
P1013	P2-30 DO YOU COMPUTE THE LENGTH OF A WAVEGUIDE FOR SPECIFIC INSTALLATION	3	4	0
P1014	P2-31 DO YOU USE THE RIGHT HAND RULE TO DETERMINE THE DIRECTION OF PROPAGATION, DIRECTION OF "E" FIELD, OR DIRECTION OF "H" FIELD IN WAVEGUIDES	7	8	5
P1015	P2-32 DO YOU USE OR REFER TO THE TIME PHASE OF PEAK "E" OR "H" LINES IN WAVEGUIDES	3	4	0
P1016	P2-33 DO YOU MEASURE THE TIME PHASE OF "E" OR "H" LINES IN WAVEGUIDES	1	1	0
P1017	P2-34 DO YOU USE OR REFER TO THE SPACE QUADRATURE OF "E" OR "H" LINES IN WAVEGUIDES	2	1	2
P1018	P2-35 ARE HIGH POWER PROBES USED ON WAVEGUIDES OR CAVITY RESONATORS YOU WORK WITH	9	8	7
P1019	P2-36 ARE LOW POWER PROBES USED ON WAVEGUIDES OR CAVITY RESONATORS YOU WORK WITH	11	15	2
P1020	P2-37 ARE LOOPS USED ON WAVEGUIDES OR CAVITY RESONATORS YOU WORK WITH	25	30	17
P1021	P2-38 ARE APERTURES (WINDOWS OR IRISES) USED ON WAVEGUIDES OR CAVITY RESONATORS YOU WORK WITH	20	24	13
P1022	P2-39 ARE DON'T REMEMBER THE KIND OF ENERGY COUPLING USED ON WAVEGUIDES OR CAVITY RESONATORS YOU WORK WITH	23	30	10
P1023	P2-40 DO YOU DETERMINE WHERE PROBES SHOULD BE MOUNTED IN WAVEGUIDES OR CAVITY RESONATORS WITHOUT REFERRING TO TECHNICAL DATA	2	3	0
P1024	P2-41 DO YOU DETERMINE THE POSITIONING OF LOOPS IN WAVEGUIDES OR CAVITY RESONATORS WITHOUT REFERRING TO TECHNICAL DATA	3	4	0

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	BY-TSK	SPC 001	SPC 002	SPC 003	
P1025	P2-42 DO YOU DETERMINE THE POSITIONING OR SIZE OF APERTURES IN WAVEGUIDES OR CAVITY RESONATORS WITHOUT REFERRING TO TECHNICAL DATA	2	3	0	
P1026	P2-43 ARE CHOKE JOINTS USED IN WAVEGUIDES OR CAVITY RESONATORS YOU WORK WITH	10	13	5	
P1027	P2-44 ARE ROTATING JOINTS USED IN WAVEGUIDES OR CAVITY RESONATORS YOU WORK WITH	41	51	22	
P1028	P2-45 ARE DON'T REMEMBER THE KIND OF JOINTS USED IN WAVEGUIDES OR CAVITY RESONATORS YOU WORK WITH	18	23	5	
P1029	P2-46 DO YOU TUNE CAVITY RESONATORS USING CAPACITIVE TUNING	28	35	10	
P1030	P2-47 DO YOU TUNE CAVITY RESONATORS USING INDUCTIVE TUNING	20	24	13	
P1031	P2-48 DO YOU TUNE CAVITY RESONATORS USING VOLUME TUNING	22	25	15	
P1032	P2-49 DO YOU TUNE CAVITY RESONATORS USING DON'T REMEMBER THE METHOD OF TUNING	14	18	5	
P1033	P2-50 DO YOU MEASURE THE FREQUENCY OF SIGNALS IN CAVITY RESONATORS	42	54	22	
P1034	P3-01 IN YOUR PRESENT JOB DO YOU WORK WITH KLYSTRONS, TRAVELING WAVE TUBES (TWT), PARAMETRIC AMPLIFIERS, OR MAGNETRONS	59	75	32	
P1035	P3-02 DO YOU USE OR REFER TO INTERELECTRODE CAPACITANCE	32	38	22	
P1036	P3-03 DO YOU USE OR REFER TO ELECTRON TRANSIT TIME	24	30	15	
P1037	P3-04 DO YOU USE OR REFER TO LEAD INDUCTANCE	23	28	13	
P1038	P3-05 DO YOU USE OR REFER TO RF LOSSES IN EXTERNAL CIRCUITRY	30	38	15	
P1039	P3-06 DO YOU USE OR REFER TO PRINCIPLE OF ELECTRON VELOCITY MODULATION	16	23	2	
P1040	P3-07 DO YOU USE OR REFER TO ELECTRON BUNCHING	32	39	17	
P1041	P3-08 DO YOU WORK WITH TWO-CAVITY KLYSTRONS	11	11	10	
P1042	P3-09 DO YOU WORK WITH THREE-CAVITY KLYSTRONS	7	10	2	
P1043	P3-10 DO YOU WORK WITH REFLEX KLYSTRONS	57	72	30	
P1044	P3-11 DO YOU WORK WITH TRAVELING-WAVE TUBES (TWT)	8	8	7	
P1045	P3-12 DO YOU WORK WITH NONDEGENERATIVE PARAMETRIC AMPLIFIERS	5	7	0	MICROWAVE AMPLIFIERS AND OSCILLATORS
P1046	P3-13 DO YOU WORK WITH UP-CONVERTER PARAMETRIC AMPLIFIERS	4	6	0	
P1047	P3-14 DO YOU WORK WITH MAGNETRONS	61	76	35	
P1048	P3-15 DO YOU INSPECT KLYSTRONS OR TWT	50	62	30	
P1049	P3-16 DO YOU CLEAN KLYSTRONS OR TWT	41	49	25	
P1050	P3-17 DO YOU TUNE KLYSTRONS OR TWT ELECTRICALLY	43	51	30	
P1051	P3-18 DO YOU TUNE KLYSTRONS OR TWT MECHANICALLY	54	64	32	
P1052	P3-19 DO YOU PERFORM OPERATIONAL CHECKS OF KLYSTRONS OR TWT	55	68	32	
P1053	P3-20 DO YOU TROUBLESHOOT KLYSTRONS OR TWT	45	54	30	
P1054	P3-21 DO YOU REMOVE OR REPLACE COMPLETE KLYSTRON OR TWT	59	73	35	
P1055	P3-22 DO YOU REMOVE OR REPLACE KLYSTRON OR TWT COMPONENTS	20	25	10	
P1056	P3-23 DO YOU INSPECT PARAMETRIC AMPLIFIERS	14	20	5	
P1057	P3-24 DO YOU CLEAN PARAMETRIC AMPLIFIERS	14	20	5	
P1058	P3-25 DO YOU ADJUST PARAMETRIC AMPLIFIERS	14	20	5	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		SPC 001	SPC 002	SPC 003
P1059	P3-26 DO YOU TUNE PARAMETRIC AMPLIFIERS	14	20	5
P1060	P3-27 DO YOU PERFORM OPERATIONAL CHECKS OF PARAMETRIC AMPLIFIERS	14	18	5
P1061	P3-28 DO YOU TROUBLESHOOT PARA-ETRIC AMPLIFIERS	13	17	5
P1062	P3-29 DO YOU REMOVE OR REPLACE COMPLETE PARAMETRIC AMPLIFIER	12	15	5
P1063	P3-30 DO YOU REMOVE OR REPLACE PARAMETRIC AMPLIFIER COMPONENTS	13	17	5
P1064	P3-31 DO YOU INSPECT MAGNETRONS	58	72	32
P1065	P3-32 DO YOU CLEAN MAGNETRONS	50	61	32
P1066	P3-33 DO YOU ADJUST MAGNETRONS	51	66	25
P1067	P3-34 DO YOU TUNE MAGNETRONS	50	65	22
P1068	P3-35 DO YOU PERFORM OPERATIONAL CHECKS OF MAGNETRONS	59	73	32
P1069	P3-36 DO YOU TROUBLESHOOT MAGNETRONS	48	58	30
P1070	P3-37 DO YOU REMOVE OR REPLACE COMPLETE MAGNETRON	59	73	32
P1071	P3-38 DO YOU REMOVE OR REPLACE MAGNETRON COMPONENTS	17	23	7
P1072	P3-39 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TWO-CAVITY KLYSTRONS COLLECTOR PLATES	10	13	5
P1073	P3-90 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TWO-CAVITY KLYSTRONS CATCHER CAVITIES	5	8	0
P1074	P3-91 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TWO-CAVITY KLYSTRONS CATCHER GRIDS	5	7	0
P1075	P3-92 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TWO-CAVITY KLYSTRONS FEEDBACK LOOPS	10	10	10
P1076	P3-93 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TWO-CAVITY KLYSTRONS DRIFT SPACES	7	10	2
P1077	P3-94 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TWO-CAVITY KLYSTRONS BUNCHER GRIDS	6	10	0
P1078	P3-95 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TWO-CAVITY KLYSTRONS BUNCHER CAVITIES	7	8	5
P1079	P3-96 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TWO-CAVITY KLYSTRONS CONTROL GRIDS	14	17	10
P1080	P3-97 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TWO-CAVITY KLYSTRONS CATHODES	15	18	10
P1081	P3-98 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF REFLEX KLYSTRON REPELLER (REFLECTOR) PLATES	48	58	30
P1082	P3-99 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF REFLEX KLYSTRON GRIDS	39	52	15
P1083	P3-00 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF REFLEX KLYSTRON GRID CAVITY GAPS	31	42	10
P1084	P3-01 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF REFLEX KLYSTRON RESONANT CAVITIES	47	58	27
P1085	P3-02 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF REFLEX KLYSTRON MAGNETIC COUPLING LOOPS	22	30	7
P1086	P3-03 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF REFLEX KLYSTRON FILAMENTS	39	52	15
P1087	P3-04 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF REFLEX KLYSTRON CATHODES	38	51	15

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	BY-TSK	SPC 001	SPC 002	SPC 003	
P1088	P3-55 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF REFLEX KLYSTRON OUTPUT LEADS	33	45	13	
P1089	P3-56 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TRAVELING-WAVE TUBES FILAMENTS	5	4	5	
P108A	P3-57 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TRAVELING-WAVE TUBES CATHODES	5	4	5	
P108B	P3-58 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TRAVELING-WAVE TUBES MODULATOR GRIDS	4	4	2	
P108C	P3-59 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TRAVELING-WAVE TUBES ANODES	5	4	5	
P108D	P3-60 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TRAVELING-WAVE TUBES HELIXES	3	3	2	
P108E	P3-61 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TRAVELING-WAVE TUBES COLLECTORS	4	4	2	
P108F	P3-62 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TRAVELLING-WAVE TUBES MAGNETS	5	7	2	
P1090	P3-63 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TRAVELING-WAVE TUBES ATTENUATORS	5	6	5	
P1091	P3-64 DO YOU PERFORM TASKS ON PARAMETRIC AMPLIFIER FERRITE CIRCULATORS	4	4	2	
P1092	P3-65 DO YOU PERFORM TASKS ON PARAMETRIC AMPLIFIER SIGNAL CAVITIES	4	4	2	
P1093	P3-66 DO YOU PERFORM TASKS ON PARAMETRIC AMPLIFIER IDLER CAVITIES	1	1	0	
P1094	P3-67 DO YOU PERFORM TASKS ON PARAMETRIC AMPLIFIER VARACTOR DIODES	4	6	0	
P1095	P3-68 DO YOU PERFORM TASKS ON PARAMETRIC AMPLIFIER FERRITE ISOLATORS	2	3	0	
P1096	P3-69 DO YOU PERFORM TASKS ON PARAMETRIC AMPLIFIER REVERSE-BIAS BATTERIES	1	1	0	
P1097	P3-70 DO YOU PERFORM TASKS ON ANODES	14	20	5	
P1098	P3-71 DO YOU PERFORM TASKS ON ANODE COOLING PINS	5	8	0	
P1099	P3-72 DO YOU PERFORM TASKS ON COUPLING LOOPS	9	13	2	
P109A	P3-73 DO YOU PERFORM TASKS ON HEATER LEADS	16	24	2	
P109B	P3-74 DO YOU PERFORM TASKS ON RESONANT CAVITIES	19	27	5	
P109C	P3-75 DO YOU PERFORM TASKS ON CATHODES	19	27	5	
P109D	P3-76 DO YOU PERFORM TASKS ON MAGNETS	23	32	7	
P109E	G1-01 DO YOU USE OR REFER TO STORAGE REGISTERS	24	21	30	
P109F	G1-02 DO YOU USE OR REFER TO SHIFT REGISTERS	25	21	32	
P10A0	G1-03 DO YOU USE OR REFER TO LOGIC SYMBOLS OF SHIFT REGISTERS	23	17	32	
P10A1	G1-04 DO YOU USE OR REFER TO LOGIC SYMBOLS OF STORAGE REGISTERS	23	18	30	
P10A2	G1-05 DO YOU TRACE THE DATA FLOW THROUGH LOGIC DIAGRAMS OF SHIFT REGISTERS	21	17	27	REGISTERS
P10A3	G1-06 DO YOU TRACE THE DATA FLOW THROUGH LOGIC DIAGRAMS OF OTHER TYPE OF REGISTERS	24	21	30	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	QUESTION	SPC 001	SPC 002	SPC 003	
01116	Q1-07 DO YOU DETERMINE THE STATE OF EACH FLIP-FLOP OF A SHIFT REGISTER AFTER A SPECIFIED NUMBER OF SHIFT PULSES HAVE PASSED	24	23	27	
01117	Q2-01 DO YOU WORK WITH DIGITAL COUNTERS, REGISTERS, OR STORAGE DEVICES IN YOUR PRESENT JOB	38	42	30	
01118	Q2-02 DO YOU USE OR REFER TO DELAY LINES	20	29	13	
01119	Q2-03 DO YOU USE OR REFER TO MAGNETIC CORES	11	15	2	
01120	Q2-04 DO YOU USE OR REFER TO MAGNETIC DRUMS	10	14	2	STORAGE DEVICES
01121	Q2-05 DO YOU USE OR REFER TO MAGNETIC TAPES	12	8	17	
01122	Q2-06 DO YOU USE OR REFER TO ACCESS TIME OR SPEED OF MEMORY SYSTEMS	14	14	15	
01123	Q2-07 DO YOU USE OR REFER TO WORD CAPACITY OF MEMORY SYSTEMS	12	8	17	
01124	Q2-08 DO YOU USE OR REFER TO VOLATILITY OF MEMORY SYSTEMS	8	7	10	
01125	Q2-09 DO YOU USE OR REFER TO LOGIC SYMBOL OF DELAY LINES	15	18	10	
01126	Q3-01 IN YOUR PRESENT JOB, DO YOU WORK WITH DIGITAL-TO-ANALOG (D/A) CONVERTERS, ANALOG-TO-DIGITAL (A/D) CONVERTERS, OR BINARY-TO-DECIMAL READOUT CONVERTERS	26	27	25	
01127	Q3-02 DO YOU COMPUTE OUTPUT VOLTAGES FOR ELECTROMECHANICAL DIGITAL-TO-ANALOG (D/A) CONVERTERS FOR GIVEN INPUT VOLTAGES	5	4	5	
01128	Q3-03 DO YOU USE OR REFER TO THE GENERAL RULE THAT THE COUNT IN ELECTROMECHANICAL DIGITAL-TO-ANALOG (D/A) CONVERTERS IS DETERMINED BY ADDING THE DENOMINATORS OF THE RESISTORS	4	3	5	
01129	Q3-04 DO YOU COMPUTE ANALOG VOLTAGES FOR GIVEN BINARY COUNTS IN ELECTRONIC DIGITAL-TO-ANALOG (D/A) CONVERTERS	5	4	7	DIGITAL TO ANALOG CONVERTERS
01130	Q3-05 DO YOU PERFORM SAMPLE FUNCTION TASKS ON VARIABLE TIME ANALOG-TO-DIGITAL (A/D) CONVERTER CIRCUITS	8	10	5	
01131	Q3-06 DO YOU PERFORM HOLD FUNCTION TASKS ON VARIABLE TIME ANALOG-TO-DIGITAL (A/D) CONVERTER CIRCUITS	6	7	5	
01132	Q3-07 DO YOU PERFORM COMPARE FUNCTION TASKS ON VARIABLE TIME ANALOG-TO-DIGITAL (A/D) CONVERTER CIRCUITS	6	8	2	
01133	Q3-08 DO YOU PERFORM DIGITIZE FUNCTION TASKS ON VARIABLE TIME ANALOG-TO-DIGITAL (A/D) CONVERTER CIRCUITS	6	8	2	
01134	Q3-09 DO YOU PERFORM, DON'T REMEMBER WHICH FUNCTION TASKS ON VARIABLE TIME ANALOG-TO-DIGITAL (A/D) CONVERTER CIRCUITS	5	7	2	
01135	Q3-10 DO YOU USE OR REFER TO SAMPLE FUNCTION OF A/D CONVERTERS	8	7	10	
01136	Q3-11 DO YOU USE OR REFER TO HOLD FUNCTION OF A/D CONVERTERS	7	7	7	
01137	Q3-12 DO YOU USE OR REFER TO COMPARE FUNCTION OF A/D CONVERTERS	7	8	5	
01138	Q3-13 DO YOU USE OR REFER TO DIGITAL FUNCTION OF A/D CONVERTERS	8	7	10	
01139	Q3-14 DO YOU PERFORM ANY TASKS ON MECHANICAL ANALOG-TO-DIGITAL (A/D) CONVERTERS	6	8	2	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DY-TSK	SPC 001	SPC 002	SPC 003	
R1-01	DO YOU WORK WITH PHANTASTRON CIRCUITRY IN YOUR PRESENT JOB	48	61	25	PHANTASTRONS
R2-01	IN YOUR PRESENT JOB DO YOU WORK WITH SCHMITT TRIGGER CIRCUITS	52	66	27	
R2-02	DO YOU TRACE DATA FLOW THROUGH SCHMITT TRIGGER SCHEMATIC DIAGRAMS	46	58	25	SCHMITT TRIGGERS
R2-03	DO YOU USE OR REFER TO SCHMITT TRIGGER LOGIC SYMBOLS	31	39	15	
R3-01	IN YOUR PRESENT JOB DO YOU FABRICATE MULTICONDUCTOR CABLES	41	45	32	CABLE FABRICATION
R3-02	DO YOU FABRICATE COAXIAL CABLES	43	49	32	
S1-01	IN YOUR PRESENT JOB DO YOU PERFORM ANY TASKS ON VISUAL READOUT SYSTEMS	59	59	60	
S1-02	DO YOU PERFORM ANY TASKS ON NIXIE LIGHTS OR NIXIE LIGHT DECODER SYSTEMS	14	7	25	INPUT/OUTPUT DEVICES
S1-03	DO YOU ANALYZE NIXIE LIGHT DECODER SYSTEMS USING BOOLEAN ALGEBRA	3	3	2	
S2-01	DO YOU WORK WITH PHOTO TUBES IN YOUR PRESENT JOB	76	77	72	PHOTO SENSITIVE DEVICES
S3-01	IN YOUR PRESENT JOB DO YOU WORK WITH CHOPPER CIRCUITS	20	28	5	
S3-02	DO YOU MEASURE EXCITATION FREQUENCIES	4	6	0	
S3-03	DO YOU MEASURE VOLTAGE-CURRENT PHASE RELATIONSHIPS	5	8	0	
S3-04	DO YOU USE OR REFER TO EXCITATION FREQUENCIES	4	6	0	
S3-05	DO YOU USE OR REFER TO VOLTAGE-CURRENT PHASE RELATIONSHIPS	7	11	0	SYNCHRONOUS VIBRATIONS (CHOPPER CIRCUITS)
S3-06	DO YOU USE SERVOS IN CONJUNCTION WITH CHOPPER CIRCUIT OPERATION	7	11	0	
S3-07	DO YOU USE DETECTORS IN CONJUNCTION WITH CHOPPER CIRCUIT OPERATION	8	13	0	
S3-08	DO YOU USE ERROR SIGNAL DEVICES IN CONJUNCTION WITH CHOPPER CIRCUIT OPERATION	14	20	5	
S3-09	DO YOU USE COMPARISON CIRCUITS IN CONJUNCTION WITH CHOPPER CIRCUIT OPERATION	10	13	5	
T1-01	DOES YOUR PRESENT JOB INVOLVE ANY TASKS DEALING WITH INFRARED SYSTEMS	23	27	15	
T1-02	DO YOU INSPECT INFRARED SYSTEMS	21	27	10	
T1-03	DO YOU CLEAN INFRARED SYSTEMS	23	28	13	
T1-04	DO YOU ADJUST OR CALIBRATE INFRARED SYSTEMS	21	24	15	
T1-05	DO YOU OPERATE INFRARED SYSTEMS	21	24	15	
T1-06	DO YOU TROUBLESHOOT WIRE CONNECTIONS OF INFRARED SYSTEMS	16	20	10	
T1-07	DO YOU TROUBLESHOOT MAJOR ASSEMBLIES OF INFRARED SYSTEMS	16	20	10	
T1-08	DO YOU TROUBLESHOOT DOWN TO INFRARED SYSTEM COMPONENT PARTS	15	18	10	INFRARED
T1-09	DO YOU REMOVE OR REPLACE MAJOR ASSEMBLIES OF INFRARED SYSTEMS	18	24	7	
T1-10	DO YOU REMOVE OR REPLACE INFRARED SYSTEM COMPONENT PARTS	16	21	7	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	QUESTION	SPC 001	SPC 002	SPC 003	
T1169	T1-11 DO YOU USE OR REFER TO FAR REGION	0	0	0	
T1170	T1-12 DO YOU USE OR REFER TO INTERMEDIATE REGION	0	0	0	
T1171	T1-13 DO YOU USE OR REFER TO NEAR REGION	0	0	0	
T1172	T1-14 DO YOU USE OR REFER TO MICRON	2	1	2	
T1173	T1-15 DO YOU USE OR REFER TO GRAY BODIES	1	0	2	
T1174	T1-16 DO YOU USE OR REFER TO BLACK BODIES	1	0	2	
T1175	T1-17 DO YOU USE OR REFER TO ABSORPTION	4	3	5	
T1176	T1-18 DO YOU USE OR REFER TO SCATTERING	4	3	5	
T1177	T1-19 DO YOU USE OR REFER TO ABSOLUTE ZERO	3	1	5	
T1178	T1-20 DO YOU PERFORM TASKS ON RETICLE	0	0	0	
T1179	T1-21 DO YOU PERFORM TASKS ON TARGET BUTTONS	0	0	0	
T1180	T1-22 DO YOU PERFORM TASKS ON ERECTOR LENSES	0	0	0	
T1181	T1-23 DO YOU PERFORM TASKS ON OCULAR LENSES	3	1	5	
T1182	T1-24 DO YOU PERFORM TASKS ON CORRECTION LENSES	2	0	5	
T1183	T1-25 DO YOU PERFORM TASKS ON FILTERS	13	13	13	
T1184	T1-26 DO YOU PERFORM TASKS ON SPHERICAL MIRRORS	10	14	2	
T1185	T1-27 DO YOU PERFORM TASKS ON PLANE MIRRORS	4	1	7	
T1186	T2-01 DOES YOUR PRESENT JOB INVOLVE ANY TASKS DEALING WITH LASERS	0	0	0	
T1187	T2-02 DO YOU INSPECT LASER SYSTEMS	0	0	0	
T1188	T2-03 DO YOU CLEAN LASER SYSTEMS	0	0	0	
T1189	T2-04 DO YOU OPERATE LASER SYSTEMS	0	0	0	
T1190	T2-05 DO YOU OPERATE LASER SYSTEMS	0	0	0	
T1191	T2-06 DO YOU TROUBLESHOOT WIRE CONNECTIONS OF LASER SYSTEMS	0	0	0	
T1192	T2-07 DO YOU TROUBLESHOOT MAJOR ASSEMBLIES OF LASER SYSTEMS	0	0	0	
T1193	T2-08 DO YOU TROUBLESHOOT TO COMPONENT PARTS OF LASER SYSTEMS	0	0	0	
T1194	T2-09 DO YOU REMOVE OR REPLACE MAJOR ASSEMBLIES OF LASER SYSTEMS	0	0	0	LASERS
T1195	T2-10 DO YOU REMOVE OR REPLACE COMPONENT PARTS OF LASER SYSTEMS	0	0	0	
T1196	T2-11 DO YOU USE OR REFER TO ANGSTROMS (A)	0	0	0	
T1197	T2-12 DO YOU USE OR REFER TO ELECTRON ENERGY LEVELS	0	0	0	
T1198	T2-13 DO YOU USE OR REFER TO GROUND STATE	0	0	0	
T1199	T2-14 DO YOU USE OR REFER TO EXCITED STATE	0	0	0	
T1200	T2-15 DO YOU USE OR REFER TO PACKET OF RADIATION	0	0	0	
T1201	T2-16 DO YOU USE OR REFER TO PHOTONS	0	0	0	
T1202	T2-17 DO YOU USE OR REFER TO SPONTANEOUS EMISSION	0	0	0	
T1203	T2-18 DO YOU USE OR REFER TO STIMULATED EMISSION	0	0	0	
T1204	T2-19 DO YOU USE OR REFER TO COHERENCE OR INCOHERENCE	0	0	0	
T1205	T2-20 DO YOU USE OR REFER TO INVERSION LEVEL	0	0	0	
T1206	T2-21 DO YOU USE OR REFER TO MONOCHROMATIC	0	0	0	
T1207	T2-22 DO YOU WORK WITH ACTIVE MATERIALS	0	0	0	
T1208	T2-23 DO YOU WORK WITH PUMPING SOURCES	0	0	0	
T1209	T2-24 DO YOU WORK WITH FULL SILVERED (100% REFLECTIVE) MIRRORS	0	0	0	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		BY-TSK	SPC 001	SPC 002	SPC 003	
T1210	T2-26 00	YOU WORK WITH HALF SILVERED (92% REFLECTIVE) MIRRORS	0	0	0	
T1211	T2-26 00	YOU WORK WITH HELICAL FLASHTUBES	0	0	0	
T1212	T2-27 00	YOU WORK WITH RUBY	0	0	0	
T1213	T2-28 00	YOU WORK WITH HELIUM-NEON	0	0	0	
T1214	T2-29 00	YOU WORK WITH HELIUM-XENON	0	0	0	
T1215	T2-30 00	YOU WORK WITH XENON	0	0	0	
T1216	T2-31 00	YOU WORK WITH CESIUM-HELIUM	0	0	0	
T1217	T2-32 00	YOU WORK WITH ARGON	0	0	0	
T1218	T2-33 00	YOU WORK WITH NEODYMIUM IN GLASS	0	0	0	
T1219	T2-34 00	YOU WORK WITH GALLIUM ARSENIDE	0	0	0	
T1220	T3-01 IN	YOUR PRESENT JOB DO YOU WORK WITH DISPLAY TUBES, SUCH AS DIRECT VIEW STORAGE (DVST) OR MULTIPLE MODE STORAGE TUBES (MMST)	9	10	7	
T1221	T3-02 00	YOU INSPECT DVST OR MMST	8	10	5	
T1222	T3-03 00	YOU CLEAN DVST OR MMST	7	8	5	
T1223	T3-04 00	YOU ADJUST OR CALIBRATE DVST OR MMST	6	8	2	
T1224	T3-05 00	YOU OPERATE SYSTEMS THAT CONTAIN DVST OR MMST	8	10	5	
T1225	T3-06 00	YOU TROUBLESHOOT DVST OR MMST CIRCUITS	8	10	5	DISPLAY TUBES
T1226	T3-07 00	YOU REMOVE OR REPLACE DVST OR MMST TUBES FROM MAJOR ASSEMBLIES OR UNITS	8	10	5	
T1227	T3-08 00	YOU PERFORM TASKS THAT MAKE IT NECESSARY TO NAME THE VARIOUS ELEMENTS OF DVST	4	4	2	
T1228	T3-09 00	YOU PERFORM TASKS THAT MAKE IT NECESSARY TO NAME THE VARIOUS ELEMENTS OF MMST	1	1	0	
T1229	T3-10 00	YOU PERFORM TASKS ON FLOOD GUNS	0	0	0	
T1230	T3-11 00	YOU PERFORM TASKS ON WRITE GUNS	5	6	2	
T1231	T3-12 00	YOU PERFORM TASKS ON ATTACK GUNS	0	0	0	
T1232	T3-13 00	YOU PERFORM TASKS ON ERASE GUNS	3	4	0	
T1233	T3-14 00	YOU PERFORM TASKS ON STORAGE GRIDS	1	1	0	
U1234	U1-01 IN	YOUR PRESENT JOB, DO YOU PERFORM ANY PROGRAMMING TASKS	7	7	7	
U1235	U1-02 00	YOU USE OR REFER TO DECIMAL SYSTEMS	3	4	5	
U1236	U1-03 00	YOU USE OR REFER TO PROGRAMS	3	3	2	
U1237	U1-04 00	YOU USE OR REFER TO HEXIDECIMAL SYSTEMS	1	1	0	PROGRAMMING
U1238	U1-05 00	YOU USE OR REFER TO 8-4-2-1 SYSTEMS	3	3	2	
U1239	U1-06 00	YOU USE OR REFER TO FOUR SYSTEMS	1	0	2	
U1240	U1-07 00	YOU USE OR REFER TO BINARY SYSTEMS	7	7	7	
U1241	U1-08 00	YOU USE OR REFER TO TIME-SHARING	1	0	2	
U1242	U1-09 00	YOU USE OR REFER TO DATA WORDS	3	1	5	
U1243	U1-10 00	YOU USE OR REFER TO ADDRESS WORDS	2	1	2	
U1244	U1-11 00	YOU USE OR REFER TO ADDRESS/SUBADDRESS	2	1	2	
U1245	U1-12 00	YOU USE OR REFER TO STEERING/INFORMATION	2	1	2	
U1246	U1-13 00	YOU USE OR REFER TO INFORMATION WORDS	3	1	5	
U1247	U1-14 00	YOU PERFORM TASKS ON SINGLE LEVEL PROGRAMMING	1	1	5	
U1248	U1-15 00	YOU PERFORM TASKS ON MULTI-LEVEL PROGRAMMING	1	0	2	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

BY-TSK		SPC 001	SPC 002	SPC 003	
U1249	U1-16 DO YOU PERFORM TASKS ON INPUT DEVICES	6	8	2	
U1250	U1-17 DO YOU PERFORM TASKS ON STORAGE DEVICES	5	7	2	
U1251	U1-18 DO YOU PERFORM TASKS ON ARITHMETIC SECTIONS	5	7	2	
U1252	U1-19 DO YOU PERFORM TASKS ON CONTROL SECTIONS	9	13	2	
U1253	U1-20 DO YOU PERFORM TASKS ON OUTPUT DEVICES	10	13	5	
U1254	U1-21 DO YOU PERFORM TASKS ON POWER SUPPLIES	10	13	5	
U1255	U2-01 DO YOU USE DECIBELS TO EXPRESS AMPLIFICATION AND ATTENUATION	68	79	50	
U1256	U2-02 DO YOU USE LOGARITHMS TO COMPUTE OUTPUT POWER IN DECIBELS	25	35	7	DB AND POWER RATIOS
U1257	U2-03 DO YOU USE LOGARITHMS TO COMPUTE ATTENUATION IN DECIBELS	27	37	10	
U1258	U2-04 DUMMY TASK TO IDENTIFY RESPONDENTS WHO PERFORMED NO TASKS	1	1	0	